Lower Thames Crossing

6.3 Environmental Statement Appendices
Appendix 8.14 – Designated Sites Air Quality Assessment (1 of 4)

APFP Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

DATE: October 2022

Planning Inspectorate Scheme Ref: TR010032
Application Document Ref: TR010032/APP/6.3

VERSION: 1.0

Lower Thames Crossing

6.3 Environmental Statement Appendices Appendix 8.14 – Designated Sites Air Quality Assessment

List of contents

Page number

List of plates

Page number

List of tables

Page number

List of figures

1 Introduction

1.1 The Project

1.1.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent and the M25 south of junction 29, crossing under the River Thames through a tunnel. The Project route is presented in Plate 1.1.

1.1.2 The A122 would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13, M25 junction 29 and the M25 south of junction 29. The tunnel portals would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

1.1.3 Junctions are proposed at the following locations:

a. New junction with the A2 to the south-east of Gravesend

b. Modified junction with the A13/A1089 in Thurrock

c. New junction with the M25 between junctions 29 and 30

1.1.4 To align with National Policy Statement for National Networks (Department for Transport, 2014) policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied in line with the Dartford Crossing. Vehicles would be charged for using the new tunnel.

1.1.5 The Project route would be three lanes in both directions, except for:

a. link roads

b. stretches of the carriageway through junctions

c. the southbound carriageway from the M25 to the junction with the A13/A1089, which would be two lanes

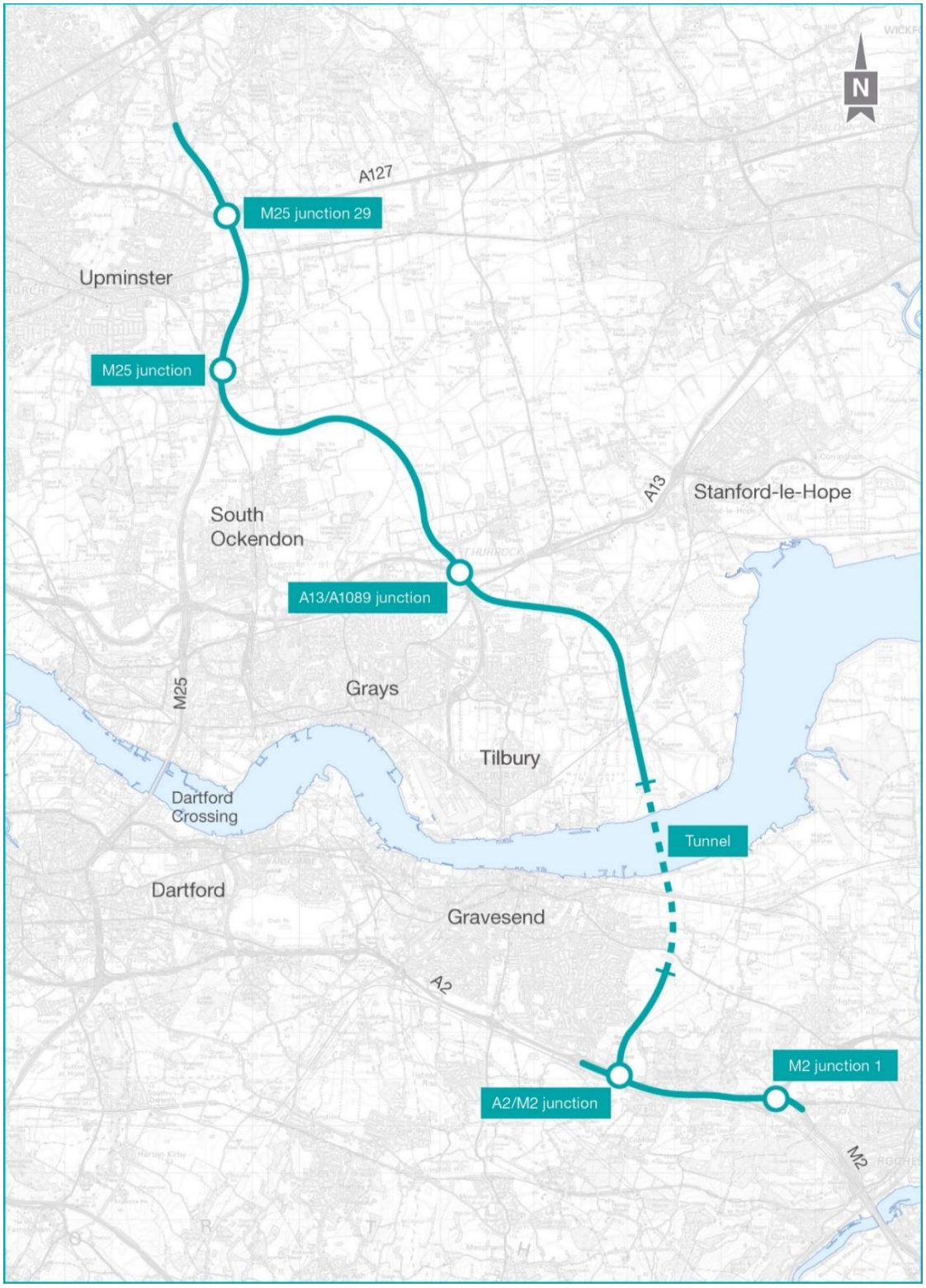
1.1.6 In common with most A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. The A122 design outside the tunnel would include emergency areas. The tunnel would include a range of enhanced systems and response measures instead of emergency areas.

1.1.7 The A122 would be classified as an ‘all-purpose trunk road’ with green signs. For safety reasons, walkers, cyclists, horse riders and slow-moving vehicles would be prohibited from using it.

1.1.8 The Project would include adjustment to a number of local roads. There would also be changes to a number of Public Rights of Way, used by walkers, cyclists and horse riders. Construction of the Project would also require the installation and diversion of a number of utilities, including gas pipelines, overhead electricity powerlines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure.

1.1.9 The Project has been developed to avoid or minimise significant effects on the environment. The measures adopted include landscaping, noise mitigation, green bridges, floodplain compensation, new areas of ecological habitat and two new parks.

Plate 1.1 Lower Thames Crossing route



1.2 Purpose of the report

1.2.1 Anthropogenic emissions of ammonia (NH_3) and nitrogen oxides (NO_x) to the atmosphere have increased significantly over the last century, due mainly to agricultural intensification and burning of fossil fuels. Global emissions of

oxidised nitrogen from fossil fuel combustion and reduced nitrogen from agricultural sources are causing an increase in nitrogen deposition (referred to as N deposition throughout the rest of this report), both as dry deposition in gaseous form and as wet deposition in precipitation. There is an increasing body of knowledge of the potential impacts of N deposition on semi-natural habitats, many of which are sensitive to increases in N deposition as their ecological function, species composition and diversity depend on low levels of nutrient nitrogen. Most impacts on semi-natural vegetation as a result of increased N deposition are therefore through increased nutrient levels, but there is also a pathway for impact through acidification of soil and water and disruption of nutrient cycling processes.

1.2.2 This document presents the results of an assessment of potential effects of air quality changes at sites of biodiversity importance resulting from the construction and operation of the Project. The assessment considers statutory and non-statutory designated sites, ancient woodland and veteran trees within 200m of the Affected Road Network (ARN) for the Project where it is predicted that N deposition would increase above threshold levels set out in the Design Manual for Roads and Bridges (DMRB) LA 105 Air Quality (Highways England, 2019).

1.2.3 The methodology followed is described in Section 2 of this report. The results of screening are presented in Section 3. Section 4 is a literature review to inform the impact assessment. The summary baselines and impact assessments of sites affected by construction phase only are presented in Section 5. Sites affected by operation (some also by construction) are assessed in Section 6. Section 7 provides a summary of the findings. Detailed baseline data is included in the Annexes.

2 Methodology

2.1 Overview

2.1.1 The ecological assessment of the effects of N deposition resulting from the Project accords with the requirements DMRB standards LA 104 Environmental Assessment and Monitoring (Highways England 2020a), LA 105 Air Quality (Highways England, 2019) and LA 108 Biodiversity. (Highways England, 2020b).

2.1.2 The assessment methodology also refers to the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. The professional judgement of a competent expert for biodiversity has been applied to the overall assessment of impact level and significance, as per DMRB LA 105, DMRB LA 108 and CIEEM (2018).

2.1.3 The assessment comprises the following elements:

a. desk study to identify ecological features for consideration

b. screening assessment to identify sites for assessment of the effects of N deposition

c. site investigation to inform assessment of N deposition

d. assessment of ecological significance of N deposition

2.2 Desk study

2.2.1 DMRB LA 105 (Highways England, 2019) requires an assessment on ecological features of international, national and local nature conservation importance within 200m of the ARN. The ARN is defined in Chapter 5: Air quality, of the Environmental Statement following application of the scoping criteria within DMRB LA 105.

2.2.2 According to DMRB LA 105, the impact of construction activities on vehicle movements requires assessment if the construction programme is predicted to last longer than two years. The construction of the Project is anticipated to last approximately six years and therefore modelling of traffic and N deposition for the construction period has been undertaken. The traffic impacts associated with construction would vary across the network in each year of the construction phase. The ARN for the construction phase was therefore limited to the areas where the construction traffic triggered the scoping for a period of greater than two years in accordance with DMRB LA 105. This is due to the fact that periods of two years or less are so short term that, in terms of duration, they would not have a significant effect on air quality. The extent of the construction phase assessment study area is presented in Figure 5.2 - Construction Traffic Study Area (Application Document 6.2).

2.2.3 The operational ARN was identified using outputs from the Project's transport model for the opening year (2030) scenario, as explained in Chapter 5: Air quality. The operational air quality study area is shown in Figure 5.3 - Operational Study Area (Application Document 6.2).

2.2.4 Ecological features within 200m of the construction and operational ARNs were identified, with the following included in the air quality screening assessment:

a. International importance – Ramsar sites, Special Protection Areas (SPA) and Special Areas of Conservation (SAC)

b. National importance – Sites of Special Scientific Interest (SSSI), ancient woodland and veteran and ancient trees

c. County importance – Local Nature Reserves (LNR), Local Wildlife Sites (LWS)[1] and Nature Improvement Areas (NIA).

2.2.5 Hereafter, the features included in the assessment are referred to as 'sites'. The locations of all sites considered in the screening assessment are shown in Figure 1 of this report, as well as Figure 5.2 - Construction Traffic Study Area (Application Document 6.2) and Figure 5.3 - Operational Study Area (Application Document 6.2).

2.2.6 Information about habitats within SSSIs was taken from site citations. In addition, for those SSSIs that overlap with SACs, the relevant Site Improvement Plans were consulted for information relevant to targets for management and N deposition. For LWS and other sites of county importance information about habitats was taken from site descriptions from the relevant records centres: Kent and Medway Biological Records Centre, The Essex Wildlife Trust Biological Records Centre (EWTBRC) and Greenspace Information for Greater London (GiGL). Locations of veteran trees were identified using the Woodland Trust's ancient tree inventory.

2.3 Screening

2.3.1 Screening was carried out to identify sites for further assessment of N deposition. Screening incorporates the steps in the flow diagram, Figure 2.98, in DMRB LA 105 as follows:

a. Calculate the Do-Minimum (DM) and Do-Something (DS) project N deposition.

b. Is the total N deposition with the project less than the applicable lower critical load (LCL)? (The applicable LCL is for the habitat for which the site is designated and /or that is most sensitive to nitrogen). If yes, then the site is screened out as not significant. If no, then screening proceeds to the next step.

c. Is the change in N deposition with and without the project less than 1% of the LCL? If yes, then the site is screened out as not significant. If no, then screening proceeds to the next step.

d. Identify whether the site air quality attribute is either restore or maintain[2]

[1] LWS include Sites of Interest for Nature Conservation (SINCs), which are nature conservation sites in Greater London and Sites of Nature Conservation Interest (SNCI), of which there are a few in Surrey.
[2] Air quality attributes are not routinely published for sites other than those designated at a European level and therefore, in line with DMRB LA 105, all sites were assumed to have a 'restore' attribute.

e. If 'restore' – use the lowest change in N deposition regardless of background N deposition which would bring about a change of a loss of one species corresponding to the LCL[3]

f. Does the change in N deposition associated with the project lead to the loss of one species? If no, then the site is screened out as not significant. If yes, then the next step is to undertake detailed site investigation (Section 2.4).

2.3.2 The lowest change in N deposition which would bring about a change of a loss of one species is derived from Table 21 in Caporn *et al*. (2016). This table provides data for a limited range of habitats (sand dunes, heathland, bog and acid grassland) and therefore DMRB LA 105 instructs to take a figure of 0.4 kg N/ha/yr, as this is the lowest change in N deposition likely to lead to the loss of one species in any of the studied habitats, excluding nutrient impoverished sand dunes. Therefore, sites are screened in for further assessment if the change in N deposition is greater than 0.4 kg N/ha/yr.

2.3.3 The modelling that informs the screening process is described in Chapter 5 - Air Quality (Application Document 6.1).

2.3.4 The critical load ranges for specific habitats were obtained from the Air Pollution Information System (APIS) (Centre for Ecology and Hydrology, 2022). Site-relevant critical loads are available on APIS for SSSIs and for internationally important sites such as SACs. All ancient woodland sites that are not designated as SSSI were classified as broadleaved deciduous woodland. The habitats for other sites (eg. LWS and LNR) were determined from site citations and aerial imagery and the appropriate critical load assigned. If a site is designated for more than one habitat type then the habitat with the lowest critical load was modelled.

2.3.5 The habitats were modelled as worst-case receptor points at the closest point between the road and the designated habitat. Where the N deposition exceeded the LCL, and where the Project increase in N deposition was predicted to exceed 0.4kg N/ha/yr at the worst-case receptors (which is the threshold used to consider potential significant effects on site integrity according to DMRB LA 105), further points were added in the form of transects (i.e. line of receptors at 10m intervals extending into the habitat, as required by DMRB LA 105). However, where impacts were 0.4kg N/ha/yr or less or N deposition was below the LCL at the worst-case receptors, significant effects could be discounted, and no additional points were included in the model given that impacts will decrease with distance from the road. Professional judgement was used to position the transects, such that they were located in habitats for which the sites were designated and /or that are most sensitive to nitrogen. The ecological transect locations modelled in this assessment are shown on Figures 5.5 and 5.6 of the Environmental Statement (Application document 6.2).

[3] The lowest change in N deposition is derived from Table 21 in Caporn *et al*. (2016).

2.3.6 For the construction phase assessment, the operational phase worst-case ecological receptor points were modelled at designated habitats which were within 200m of both the construction phase ARN and operational ARN. Additional worst-case ecological receptors were added at those designated habitats within the construction ARN which were not part of the operational ARN.

2.3.7 The sites modelled for the construction phase were located next to roads that were predicted to experience an increase in N deposition as a result of forecast changes in traffic or speed band above the thresholds stated in DMRB LA 105 for a period of greater than two years. These are presented in Figure 5.2 (Application Document 6.2).

2.3.8 A total of 527 sites (some of which have more than one designation) and 208 veteran trees were identified within 200m of the operation ARN (Figure 1). The list of sites considered in screening is in Table 7.1 of Appendix 5.2 - Air Quality Baseline Conditions (Application Document 6.3). Table 5.9 of ES Chapter 5 - Air Quality (Application document 6.1) presents a summary for each habitat type and the number of habitats where background[4] N deposition exceeds the LCL. Background N deposition exceeds the LCL for all veteran trees and most of the designated habitats. Only 46 of the 527 sites are exposed to background N deposition that is below the LCL. For the purposes of the N deposition modelling, veteran trees were considered as 'broadleaved deciduous woodland' with a lower critical load of 10 kg N/ha/yr.

2.3.9 The total N deposition rates associated with road-increment NO_2 and ammonia (NH_3) were calculated at each ecological receptor location for each of the construction years, base year (2016), DM (predicted for scheme opening year of 2030 but assuming the Project was not progressed) and DS (predicted for scheme opening year and assuming the Project was progressed) scenarios. The conversion of road increment NO_2 (in $\mu g/m^3$) to N deposition (kg N/ha/yr) was as follows:

a. grassland and similar habitats: 1 $\mu g/m^3$ of NO_2 = 0.14 kg N/ha/yr

b. forests and similar habitats: 1 $\mu g/m^3$ of NO_2 = 0.29 kg N/ha/yr

2.3.10 The calculation of N deposition from road-increment NH_3 applied the Draft National Highways (2021) ammonia N deposition tool as described in Chapter 5 - Air Quality (Application document 6.1).

2.3.11 The road N deposition rate for each point along the transect was then added to the corresponding background N deposition rate obtained from the APIS website[5] and compared with the lowest critical load for habitats at the sites.

2.3.12 The full set of ecological air quality results is shown in Table 2.1 and Table 2.2 of Appendix 5.4 - Air Quality Operational Phase Results (Application Document 6.3). Sites were screened in for further assessment where the N deposition in the DM and DS scenarios was greater than 1% of the relevant lower critical load for the site and greater than 0.4 kg N/ha/yr, as explained above.

[4] Background N deposition is the three-year average (2017-2019) deposition rate obtained from the APIS database (Centre for Ecology and Hydrology, 2022).
[5] Background deposition rates are based on a three year average (2017-2019).

2.4 Site investigation

2.4.1 Figure 2.98 of DMRB LA 105 states that the purpose of the site investigation is to determine whether there are '*species located in the area where the assessment has determined an increase in N deposition that could lead to loss of one species*'. This is interpreted as identification of ecological features potentially sensitive to N deposition that could be impacted as a result of the Project.

2.4.2 Sites where the predicted N deposition exceeded the 0.4kg N/ha/yr threshold are shown in Figure 2. Some sites were visited in 2021 for preliminary data collection, but detailed site investigations using the methodology described below were undertaken in 2022.

2.4.3 Within each site, the area investigated was that predicted to be exposed to an increase in N deposition greater than 0.4 kg N/ha/yr (the nitrogen-affected area ('NAA')). The habitat within the NAA was identified in advance of site visits using aerial imagery and recorded at Level 4 of the UK Habitat Classification (UKHab) (Butcher et al, 2020). For example, many of the woodland sites were categorised at Level 4 of UKHab as 'w1f lowland mixed deciduous woodland'.

2.4.4 On site, surveyors walked a zig-zag transect through the NAA to ground-truth the UKHab classification and amend it if necessary. The habitat parcels surveyed and indicative transect locations are illustrated in Figure 4. Vegetation composition and species abundance were recorded using the DAFOR scale ('dominant', 'abundant', 'frequent', 'occasional' or 'rare') to provide a relatively rapid characterisation of the vegetation in the NAA. Particular note was made of invasive non-native species, ancient woodland indicator species, species that are reasons for designation and species that are known to be sensitive to nitrogen. One quadrat was then sampled in each UKHab Level 4 habitat type using the Domin scale, as described in Rodwell (2006). This provides a quantitative measure of cover/abundance of every higher plant in the sampled area. The quadrat size sampled depended on the structural variation in the plant community, with 50 x 50m quadrats for woodland canopy and shrub layers and 2 x 2 m for short herbaceous vegetation. The combination of DAFOR and quantitative sampling of quadrats was considered sufficient to provide a comprehensive list of the higher plants present in the NAA and their relative abundances.

2.4.5 Evidence of any obvious vegetation gradients was noted, indicated by changes in vegetation structure and composition with distance from the woodland edge with an existing road which may indicate whether any existing factors such as site management or nutrification/pollution from external sources have influenced or are influencing the habitat

2.4.6 Evidence of site management and pressures and threats were recorded (e.g. recreation, fly-tipping, encroaching development). Surveyors also made notes of the potential for beneficial management.

2.4.7 Site condition in the NAA was recorded using Defra's Biodiversity Metric 3.1 (Panks et al, 2022), with additional notes on justification of the score and on features of interest. Note was made on whether habitats are degraded versions of habitats the site is important for (as detailed in the citation), or if they have been replaced by a different habitat type.

2.4.8 Lichen surveys followed the methodology described in the Field Studies Council's Guide to using a lichen-based index to nitrogen (undated), available for download on APIS (CEH, 2022)[6]. The method involves recording the presence or absence of N-sensitive and N-tolerant lichen species on trunks or branches and calculation of a lichen indicator score (LIS) using a standardised nitrogen air quality index (NAQI). Using the LIS score an indication of air quality at a given site can be determined from the graph provided in the lichen guide. In order to record lichens, a minimum of three trees were identified at the edge of the NAA nearest to the existing road and a cluster of five trees (minimum 3) at a point further away from the road.

2.4.9 Representative photographs were collected to illustrate the features recorded.

2.5 Variables used to describe baseline

2.5.1 Site-specific information has been gathered from desk study and detailed site investigation. This was used to describe the baseline and to inform the assessment of level of impact. Published information and site-specific variables considered were:

a. Citation / reason for site designation (where available);

b. Aerial imagery of designated site / habitat to help inform habitat distribution;

c. Species composition (using species-specific Ellenberg values to indicate the existing degree of nutrient enrichment and species sensitive to nitrogen);

d. Habitat condition, using Natural England Biodiversity Metric 3.1 methodology and professional judgement;

e. Evidence of gradients in vegetation composition, structure and condition to provide an indication of exist influences on site/habitat;

f. Existing site management and pressures and threats e.g. over/under-grazing; significant recreation pressure leading to impacts such as trampling, soil compaction, increased nutrient loading, evidence of existing degradation due to N deposition from external sources such as adjacent land use.

Species composition and Ellenberg values

2.5.2 Detailed site investigations focussed on the areas of the site which the air quality modelling predicted would be affected by a change in nitrogen above the 0.4 kg N/ha/yr screening threshold (the 'NAA'; see Section 2.4 above and *Extent* section below). The plant species recorded during the transect and quadrat sampling in the detailed site investigations were compiled into a single list of species for each site.

[6] https://www.apis.ac.uk/nitrogen-lichen-field-manual

2.5.3 The Ellenberg indicator value for nitrogen was obtained for each species from tables in Hill et al (1999). Ellenberg indicator values are a way of numerically describing the ecological niche of different plant species, with respect to species' tolerance to a range of physical conditions such as light, moisture, soil pH and temperature. The Ellenberg indicator value for nitrogen (hereafter abbreviated to nitrogen EV) is used in this assessment to provide an indication of existing nutrient status and to identify species that are potentially sensitive to N deposition and therefore could be at risk of loss due to a Project-related increase in N deposition.

2.5.4 The nitrogen EV gives a general indication of preference for soil fertility, with low values corresponding to species with high stress tolerance to nutrient/nitrogen levels (Grime *et al*., 1997). It is closely correlated with the stress values of Grime (2001). As there is limited evidence for the actual response and degree of sensitivity of individual species to N deposition, those species with a nitrogen EV of 1-4 are considered to be 'potentially sensitive to N deposition'. Nitrogen EVs are given in Table 2.1.

Table 2.1 Nitrogen Ellenberg values

Nitrogen Ellenberg Value	Explanation
1	Indicator of extremely infertile sites
2	Between 1 and 3
3	Indicator of more or less infertile sites
4	Between 3 and 5
5	Indicator of sites of intermediate fertility
6	Between 5 and 7
7	Plant often found in richly fertile places
8	Between 7 and 9
9	Indicator of extremely rich situations, such as cattle resting places or near polluted rivers

2.5.5 Nitrogen EVs have been used on local and regional scales to detect the impact of N deposition on species composition (reported in Pitcairn et al. 2006). Previous authors have considered them a useful tool for detecting floristic shifts consistent with increased nutrient availability and ecosystem eutrophication (Sutton et al. 2004, Pitcairn et al., 2006).

2.5.6 Research has shown that nitrogen EVs correlate well with atmospheric N deposition, confirming the validity of the method in indicating enhanced N deposition. They can also provide a useful assessment of the N status of a site, particularly along known gradients in N deposition (Leith et al., 2005).

2.5.7 The evaluation of nitrogen sensitivity of the species recorded in the site investigations in this assessment has referred to work by Pitcairn et al. (2006), which categorised species typical of different habitats, including woodlands and grasslands, as nitrophobes or nitrophiles, depending on their response to enhanced N deposition. Although many species characteristic of more fertile sites such as mixed deciduous woodlands may have quite high nitrogen EVs, they are sensitive to high levels of N deposition and hence can be referred to as nitrophobes. Nitrophiles include those species of a high nitrogen EV, known to exist in the habitat type and species which can be classed as potential

nitrophiles. Potential nitrophiles may be species with a low nitrogen EV but known to respond rapidly to increased nitrogen. In some cases the potential nitrophiles may be constant or common species in that vegetation community but research has shown the potential for these species to respond to increased nitrogen (Pitcairn et al., 2006).

Habitat condition

2.5.8 Site specific surveys provide an assessment of habitat condition following the Natural England Biodiversity Metric 3.1 methodology (Panks et al, 2022). The metric provides an assessment of habitat quality, with the condition element considering the value of habitats relative to other habitats of the same type / distinctiveness. This provides a consistent and comparable approach to considering habitat condition as part of this assessment. The assessment of condition is being used only to describe the quality of the habitat and not as a benchmark against which to measure future vegetation change.

Evidence of gradients in vegetation composition, structure and condition

2.5.9 The assessment of effects on the integrity of a site or habitat needs to consider the area's structure, function, composition and connectivity. To inform this, evidence for the presence of vegetation gradients (changes in vegetation structure and composition along a linear transect) are considered to indicate whether any existing factors such as site management or nutrification/pollution from external sources may have influenced the area's development towards its current structure. The impact of any additional nitrogen loading on habitats needs to consider these baseline conditions and how they may influence the habitat response to increased nitrogen loading.

Existing pressures and threats

2.5.10 Evidence of any pressures on, or threats to, an area's condition is also used to inform the baseline condition for the site. Factors include grazing intensity leading to habitat succession or changes in species composition and site structure; recreational use leading to vegetation trampling, soil compaction, littering, nutrient enrichment from dogs; adjacent land use where activities such as farming can be significant sources of N deposition. Such factors can strongly influence vegetation structure and composition and will inform how additional nitrogen loading may affect it.

2.6 Determination of importance

2.6.1 The importance of the designated habitats has been determined using Table 3.9 in LA 108 Biodiversity (Highways England, 2020b).

2.6.2 The following geographic levels of importance have been assigned:

a. International importance – Ramsar sites, SPA and SAC

b. National importance – SSSI and irreplaceable habitats, including ancient woodland (AW) and veteran trees (VT)

c. County importance – LNR, LWS and NIA.

2.7 Characterisation of impacts

2.7.1 The range of variables described above, which influence an area's structure, function and composition, as well as the connectivity of associated habitats both within and outwith its boundaries, highlight the complex adaptive nature of these ecosystems. When considering the characterisation of the impact of increased N deposition on an area, it is critical that the conditions which influence its structure, function, composition and connectivity are assessed on a site-specific basis.

2.7.2 Table 3.11 of DMRB LA 108 describes the different levels of impact (from major to no change) and the key criteria are in relation to the permanence / reversibility of the impact and whether or not there is considered to be an effect on integrity or on the key characteristics of the ecological resource (as determined by assessment of duration, reversibility, extent, magnitude, frequency and/or timing of the impact).

2.7.3 According to DMRB LA 108, and in line with CIEEM guidance on Ecological Impact Assessment (CIEEM, 2018), level of impact is determined by assessment of the following characteristics:

a. positive or negative (e.g., adverse/beneficial);

b. duration (e.g., permanent/temporary);

c. reversibility (e.g., irreversible/reversible);

d. extent;

e. magnitude;

f. frequency and timing.

2.7.4 These are addressed in turn below.

Positive or negative impacts

2.7.5 Air quality modelling generates three different values for N deposition at designated habitats: a baseline figure for N deposition; a DM scenario which is the predicted opening year for the Project but without the Project being implemented; and a DS scenario which is the predicted opening year for the Project with the Project having been implemented. Full detail of this is provided in Chapter 5 - Air Quality (Application document 6.1). It is possible that modelling might predict that some designated habitats will experience a DS N deposition that is lower than DM and therefore a potential beneficial effect. However, these receptors are not screened in for ecological assessment and so are not considered here. In accordance with DMRB LA 105, only designated habitats with the potential to be negatively impacted as a result of the increase in N deposition from the Project have been screened in for further ecological assessment.

Duration and reversibility

2.7.6 The duration of impact was estimated by calculating the time taken for the DS oxides of nitrogen (NO_x) emissions to reduce to the DM NO_x emissions at opening year (2030). This calculation takes into account the forecast reductions in 'per vehicle' emissions based on the speeded banded emission factors (which are

based on Defra Emission factor toolkit v11) and gives an indication of when the total emissions from the road as a result of the Project would return to levels they would have been if the Project was not operational. The calculation interpolates total emissions between the opening year and design year (2045) DS scenarios (and therefore takes into consideration the forecast growth in traffic), meaning that the maximum duration calculated by this method is 15 years and, if the modelled emissions have not reduced to the DM value in that timeframe, the output is given as greater than 15 years. The calculation was undertaken by calculating the emissions on the road network that was impacting each of the ecological receptors that required further consideration in relation to determining significant effects. Where the road network changed between the DM and DS (i.e. where roads moved closer or further from the site) the timescale calculator was not used to determine the duration as the impact of moving the roads would potentially have a larger impact than changes in emissions and therefore is not reflected in comparison of emissions between the DM and DS scenarios. Under these circumstances particularly where roads were moved closer to sites it was assumed that the timescales to get to the DM were greater than 15 years, where roads move further from the site there is generally an improvement in N deposition.

2.7.7 Whilst there is an increase in emissions at a number of sites with a range of durations where N deposition from the road will return to pre-Project levels, as the fleet transitions to electric, particularly cars and vans, this will mean that emissions of NO_x and NH_3 from road transport will continue to reduce in the future. The effect of the DS scenario is therefore to delay rather than reverse the future predicted decreases in the road contribution. Given that the effects of increases in N deposition are not always detectable in terms of changes in vegetation composition and habitat structure and require long-term exposure to generate change (Caporn et al., 2016), it is possible that even a long-term increase in N deposition may not result in a permanent effect on the integrity of a designated habitat. Many ecosystem changes due to long-term levels of N deposition are theoretically reversible but may require intervention through habitat management to remove biomass, nutrient loading and competition from dominant species from the system (Dise et al., 2011). Recovery from long-term N deposition is ill-understood (Clark et al., 2013) and it is unclear to what extent recovery from long-term deposition is possible. Research on the recovery of grassland and heathland habitats after experimental changes in N deposition is reported in UKREATE (2007).

2.7.8 In view of the above and given that critical loads for nitrogen deposition are based on an assumed exposure over a period of 20 – 30 years, for this assessment it is considered that impacts of duration of 15 years or more are permanent and irreversible because it is not known how much longer beyond 15 years the impact is likely to persist. Impacts of less than 15 years are considered temporary and could result in effects that are reversible. However, it is recognised that the magnitude of N deposition could influence the reversibility of an effect, although this will also be influenced by factors such as background N deposition loading (Caporn et al, 2016), baseline site condition and management and external pressures (Bobbink et al, 2010, Dise et al., 2011). Where information is limited or there is any uncertainty in terms of impact level, a precautionary approach is adopted and it is assumed that the impact is irreversible. The individual site assessments explain the rationale for determination of reversibility.

Extent

2.7.9 For designated sites and habitats, the extent of impact has been estimated by using modelled transects, which extend up to 200m from the ARN. For each transect, the first point at which N deposition falls below 0.4kg/N/ha/yr was identified and a habitat parcel generated within the site, parallel to the road link ID within the ARN, which provided an estimate of the extent of the site which would be affected by a change in N deposition above the 0.4 kg N/ha/yr threshold. The percentage of the site affected was calculated by dividing the affected area extent by the total area of the site. Extent could not be calculated for veteran trees, as these are point receptors.

2.7.10 Examination of aerial imagery of the whole site and detailed site investigation of the NAA at each site contributed to the assessment of the distribution of sensitive habitats within the wider site and which habitat types are within the affected area.

2.7.11 This approach is considered suitably precautionary as the magnitude of N deposition within the affected area is not constant across the whole area because deposition decreases with distance from the emission source. Therefore, the calculated area represents a worst case, with any effects due to increased N deposition most likely to be evident closer to the road. The assessment considers the potential for changes in vegetation composition (the loss of one species in accordance with LA 105) within the affected areas and if there is a risk of habitat loss (e.g. a change from one habitat type to another).

2.7.12 The extent of area affected with respect to the net area in hectares and the proportion of the site affected is a key factor in identifying possible impacts on site integrity, in terms of a site's structure, function, composition and connectivity. This therefore has to take into account the site-specific baseline when considering how integrity may be affected. For example, if the site investigation determines that there are existing edge effects or degradation of habitat due to an existing high N deposition baseline or management practices, then an adverse effect on integrity of the site from additional N deposition may be less likely.

2.7.13 The potential for an effect on site integrity is also dependent on the magnitude of the predicted increase in N deposition and the duration of impact, as higher increases in N deposition for an extended period are more likely to result in changes in vegetation composition that may constitute an effect on integrity. The interaction between the different factors influencing site integrity is assessed on a site-specific basis using professional judgement.

Magnitude

2.7.14 The output of the air quality modelling helps to quantify the magnitude of impact. Although the thresholds of 1% of the lower critical load and 0.4 kg/N/ha/yr are used to screen designated sites and habitats for further ecological consideration by a competent expert in biodiversity (in line with DMRB LA 105), the predicted quantities of nitrogen deposited on the sites under consideration vary, as does the baseline N deposition.

2.7.15 A Natural England commissioned report NECR210 (Caporn et al, 2016) on the effects of increments of N deposition on semi-natural habitats reported that the

habitats studied showed strong curvi-linear responses to increased deposition at varying background nitrogen loads, indicating a more rapid species loss at lower levels of deposition. Where levels of N deposition are at or above the upper end of a habitat's critical load, any additional increments of long-term nitrogen are associated with further declines in species-richness, affecting site structure and composition. However, the incremental effect of long-term N deposition reduces as deposition levels increase above the upper end of the critical load for a habitat. Less polluted sites were therefore more sensitive to increases in N deposition, whereas sites already receiving high levels of N deposition had already experienced a loss in species diversity. The magnitude of N deposition at affected sites is therefore considered in relation to the baseline, DM and DS values.

2.7.16 This key relationship between extent and magnitude of impact, and the influence of baseline habitat condition on this impact is critical at a site-specific level in considering how the site's integrity may be affected. The narrative around these considerations, based on the air quality modelling data and site baseline, and the professional judgement of a competent expert in biodiversity, is set out in the conclusions section of this document. This will consider whether the structure and function of the affected area is maintained, whether connectivity between the affected area and the wider designated site or habitat is maintained, and whether the quality of the habitat within the affected area and the wider designated site or habitat is comparable to baseline conditions (Balla et al., 2013).

Frequency

2.7.17 Given that N deposition is ongoing and is measured in units of kg per hectare per year, frequency is categorised as 'annual' for all designated habitats.

Timing

2.7.18 As described above under frequency, N deposition continues throughout the operational phase of the Project. Therefore, timing is described as 'ongoing' for all designated habitats.

2.8 Determination of impact level and significance

Impact level

2.8.1 Impact level is defined in Table 3.11 of DMRB LA 108 (reproduced below in Table 2.2). In order to make assessments of effects on integrity or key characteristics of a resource, it is critical to define what these mean.

2.8.2 Integrity is defined as "the coherence of a site's ecological structure and function across its whole area" (European Commission, 2000). In assessing the potential for effects on integrity, it is essential to understand the processes and interactions on which the biodiversity features of the site depend. Ecological interactions are multiple and complex and therefore the assessment of effect on integrity relies heavily on professional judgement.

2.8.3 Key characteristics are considered to be the reasons for which a site is designated. For statutory designated sites the reasons for designation are described in the site citation but for non-statutory designations such as Local

Wildlife Sites the key characteristics may be less obvious and require determination through further desk study or site survey. The key characteristics of ancient woodland sites depend on the vegetation community that the site supports and factors such as its geology, soils and management history. Therefore, these are considered on a site-specific basis.

2.8.4 For veteran trees, integrity is considered with respect to the individual tree itself and not to the assemblages that it supports, such as lower plants or invertebrates. The key characteristics of a veteran tree are considered to include its age, size, structure and presence of dead and decaying wood, all of which are physical characteristics which are not likely to be affected by N deposition. Further detail on the assessment of veteran trees is given below.

2.8.5 The existing coherence of ecological structure and function of area of designated habitat is relevant to the assessment of potential effects on integrity. For example, previous agricultural intensification or infrastructure development may have resulted in fragments of habitat that are surrounded by development and no longer considered of sufficient size to support the typical ecosystem processes and functioning of that habitat type. Various minimum viable sizes for woodland have been suggested, ranging between 5 and 50ha (reported in JNCC (2004)). Research on edge effects in ash and oak woodland suggests that the edge effect extends to approximately 90m (McCollin et al. 2017) and therefore a woodland patch would need to more than 180m wide to support 'core habitat' that supports the typical ecosystem processes. In this assessment, the size of woodland patches and connectivity in the landscape are part of the consideration of integrity, but all AW sites, whatever their size, are valued as nationally important, in accordance with DMRB LA 108.

Table 2.2 Level of impact and typical descriptions (from DMRB LA 108, table 3.11)

Level of impact (change)		Typical description
Major	Adverse	1) Permanent/irreversible damage to a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.

Level of impact (change)		Typical description
Moderate	Adverse	1) Temporary/reversible damage to a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
Minor	Adverse	1) Permanent/irreversible damage to a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
Negligible	Adverse	1) Temporary/reversible damage to a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource; and
		2) the extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
No change		No observable impact, either positive or negative.

Significance

2.8.6 A matrix for determining the significance of effects is presented in Table 3.13 of DMRB LA 108 and reproduced below in Table 2.3. In accordance with approach adopted in the EIA for the Project, effects that are moderate, large or very large are considered significant.

Table 2.3 Significance matrix (from DMRB LA 108, table 3.13)

Resource importance	Level of impact					
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
	International or European importance	Neutral	Slight	Moderate or large	Large or very large	Very large
	UK or national importance	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Regional importance	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	County or equivalent authority importance	Neutral	Neutral or slight	Neutral or slight	Slight	Slight to moderate
	Local importance	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

2.9 Approach for veteran trees

2.9.1 The National Policy Statement (NPS) for National Networks states that: “Aged or veteran trees found outside ancient woodland are particularly valuable for biodiversity and their loss should be avoided.” The NPS refers to “the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland” but not to the deterioration of veteran trees.

2.9.2 Veteran trees within SSSIs and blocks of ancient woodland were assessed as part of those designations and not considered separately. No veteran or ancient trees were recorded within LWS. There are a number of veteran trees that are not within any designation and therefore these have been addressed as individual receptors.

2.9.3 The approach to assessment of N deposition on veteran trees is different to habitats because it is considered that the relatively small increases in N deposition as a result of the Project will not affect the key characteristics or ‘integrity’ of the trees themselves (see paragraph 2.8.4 above). The physical characteristics of a veteran tree such as age, size, structure and presence of dead and decaying wood are not likely to be affected by increased N deposition. Even a permanent (15 or more years) increase in N deposition is not anticipated to alter the key characteristics of the trees.

2.10 Overlapping sites

2.10.1 Many of the ancient woodland sites are also designated, either as LWS or SSSI. However, the boundaries of the ancient woodland blocks and the designations often do not coincide exactly and the LWS and SSSI designation may be for other features as well as ancient woodland. Therefore, the approach

taken was to assess as separate sites. However, for LWS (county value) with boundaries that largely coincide with ancient woodland sites (national value), the assessment of the ancient woodland site takes precedence over the assessment for the LWS as ancient woodland is of higher value. Overlapping sites are shown in Figure 3 and listed in Table 2.4, with the smaller site(s) in the first column. The implications of any overlaps are addressed in the individual assessments in Sections 5 and 6.

Table 2.4 Overlapping Sites

Site	Size (ha)	Overlaps	Nature of Overlap
AW_Theme_ID1420010 AW (screened in for construction only)	0.21	Straight Path Shaw LWS (1.55ha)	Small block of AW on north side of A127, entirely within Straight Path Shaw LWS.
Straight Path Shaw LWS (screened in for construction only)	1.55	Round Shaw (AW_Theme_ID 1119930) AW (2.27ha)	The part of Straight Path Shaw LWS to the south of the A127 is within Round Shaw AW
AW_Theme_ID1495743 AW (screened in for construction only)	2.51	Codham Hall Wood West SINC (2.52ha)	Entirely overlap with one another - tiny difference in size is due to slightly different mapping.
Low Well Wood(AW_Theme_ID 1505468) AW (screened in for construction only)	1.92	Low Well Wood, South Ockendon LWS (4.78ha)	The AW is entirely within the LWS
AW_Theme_ID1420009 AW (screened in for construction only)	0.10	Thick/Hollow Bottom Shaws LWS (1.93ha)	Small fragment of AW on south side of A127, entirely within the LWS
Thick/Hollow Bottom Shaws LWS (screened in for construction only)	1.93	MILL WOOD(AW_Theme_ID 1119931) AW (9.74ha)	The part of the LWS to the north of the A127 is within Mill Wood AW.
Andrews Wood(AW_Theme_ID 1499246) AW	11.88	Woodlands West of Shoreham LWS (222ha)	The AW is entirely within the LWS
AW_Theme_ID1498304 AW	4.00	Nurstead and Cozenden Woods, Nash Street LWS (22.74ha)	The AW is entirely within the LWS

Site	Size (ha)	Overlaps	Nature of Overlap
AW_Theme_ID1499144 AW	1.34	Woodlands West of Shoreham LWS (222ha)	The AW is entirely within the LWS
AW_Theme_ID1499145 AW	1.50	Woodlands West of Shoreham LWS (222ha)	The AW is entirely within the LWS
AW_Theme_ID1499250 AW	6.83	Woodlands West of Shoreham LWS (222ha)	The AW is entirely within the LWS
CONEYEARTH/PASCALLS/HOLLOWS WOODS(AW_Theme_ID 1499437) AW	37.88	Woodlands West of Shoreham LWS (222ha)	The AW is entirely within the LWS
AW_Theme_ID_1486860 (Shorne Woods) AW	6.44	Shorne And Ashenbank Woods SSSI (197.44ha)	Shorne Woods AW (6.44ha) is entirely within Shorne and Ashenbank Woods SSSI.
Shorne/Brewers Woods AW	65.91	Shorne And Ashenbank Woods SSSI	Most of Shorne/Brewers Wood is within Shorne and Ashenbank Woods SSSI, except the eastern edge.
AW_Theme_ID1486951 AW	8.82	Shorne And Ashenbank Woods SSSI	Forms the north-western corner of Shorne and Ashenbank Woods SSSI and is entirely within the SSSI
Foxburrow Wood, Upminster SINC	2.07	AW_Theme_ID1420012 AW (2.15ha)	Entirely overlap with one another - tiny difference in size is due to mapping of the southern boundary.
Barber's Wood AW	6.89	Barber's Wood And Lane LWS (8.42ha)	Barber's Wood AW is entirely within Barber's Wood LWS, but the LWS also includes a wooded lane which extends beyond the main woodland block.
Blue Bell Hill Banks And Verges LWS	9.98	Wouldham To Detling Escarpment SSSI (311.18ha)	The LWS overlaps with Unit 11 of Wouldham to Detling Escarpment SSSI.
Bridge Woods AW	135.39	Bridge Woods, Burham LWS (167.36ha)	Bridge Woods AW and Bridge Woods, Burham LWS mostly coincide, apart from an area of AW in the south-eastern corner that is not designated as LWS and an area of LWS that is not AW, between the two main blocks of AW.

Site	Size (ha)	Overlaps	Nature of Overlap
CHADWELL WOOD (AW_Theme_ID 1119923) AW	1.67	Terrels Heath Grays LWS (2.51ha)	Chadwell Wood AW and Terrels Heath Grays LWS mostly coincide. Chadwell Wood AW boundary is slightly closer to the road but Terrels Heath Grays LWS extends further to the north.
Great Wood AW	140.73	Cobham Woods SSSI (242.75ha)	Great Wood forms most of Cobham Woods SSSI Unit 4 but the southern tip of the AW is not designated as SSSI. The SSSI designation incorporates the corridor of the HS1 railway whereas the AW boundary excludes this area. The eastern boundary of both the AW and the SSSI extend across the carriageways of the M2, but the AW boundary extends further in places.
Codham Hall Wood AW	5.12	Codham Hall Woods LWS (7.88ha)	Codham Hall Wood AW is entirely within Codham Hal Woods LWS. The LWS extends beyond the AW at its north-east corner but this area is further than 200m from the ARN. A small area of the LWS extends beyond the AW to the south.
Peartree Wood AW	24.03	Court Wood, Shorne LWS (45.17ha)	Peartree Wood AW is largely within Court Wood, Shorne LWS but the boundary of the AW is closer (directly adjacent) to the ARN.
Epping-Ambresbury Banks AW	1121.52	Epping Forest SSSI (1787.92ha)	Most of Epping-Ambresbury Banks AW is also designated as SSSI and listed on the Ancient Woodland Inventory. There is a large block to the south of the M25 and a smaller area on the north-eastern edge which are not designated as SSSI or SAC. The SSSI and SAC are larger than the AW because there are several blocks of designation that are not AW.
Epping Forest SAC	1628.87	Epping Forest SSSI (1787.92ha)	Most of Epping Forest SAC is also designated as SSSI and listed on the Ancient Woodland Inventory. There is a small area in the north-eastern part of the site close to the M25, and various other blocks further south which are designated as SAC and SSSI but not AW.
Impton/Podkin Wood AW	21.14	Frith Woods Etc., Kits Coty LWS (27.06ha)	Impton/Podkin Wood AW is mostly within Frith Woods Etc., Kits Coty LWS, but the AW extends further to the north-west (around the crematorium), the LWS includes a large, unwooded area in central/eastern area, and the AW does not include a vegetated strip adjacent to the M2 (although the latter may well be a mapping error).
Ingrebourne Valley SINC	263.44	The Osiers AW (4.18ha)	The Osiers AW is entirely within Ingrebourne Valley SINC

Site	Size (ha)	Overlaps	Nature of Overlap
Great Crabbles Wood AW	24.02	Great Crabbles Wood SSSI (32.98ha)	Great Crabbles Wood AW is entirely within Great Crabbles Wood SSSI. The SSSI extends further to the north-west.
Hall Wood AW	8.06	Langdon Ridge SSSI (345.09)	Hall Wood AW is entirely within Hall/Gravelhill Woods LWS and Langdon Ridge SSSI. It is adjacent to the Langdon Complex LWS.
Hall/Gravelhill Woods LWS	9.91	Langdon Ridge SSSI (345.09)	Hall/Gravelhill Woods LWS is entirely within Langdon Ridge SSSI. It encompasses both Hall Wood and the adjacent Gravelhill Wood.
Hobbs Hole AW	1.61	Hobbs Hole LWS (2.88ha)	Most of Hobbs Hole AW is designated as LWS, apart from two very small areas on the northern edge. Most of Hobbs Hole LWS is AW but part of the LWS supports grassland.
REED'S SHAW (AW_Theme_ID 1498441) AW	1.10	Yaugher Woods LWS (23.02ha)	Reed's Shaw is a small block of AW to the north of the M2 that is entirely included within the designation of Yaugher Woods LWS.
Yaugher Wood (AW_Theme_ID 1498451) AW	19.16	Yaugher Woods LWS (23.02ha)	Yaugher Wood AW consists of blocks to the north and south of the M2. Most of the AW is designated as LWS, but the block furthest north (Highfield Wood) is not designated as LWS.
Shales More AW	10.41	Shales More LWS (10.92ha)	The AW is entirely within the LWS, with a narrow strip in the middle that is not AW.
Tylers Wood SINC	14.54	Jermains Wood SINC	The SINC boundary overlaps with Jermains Wood SINC to the north.
WESTERHAM WOOD(AW_Theme_ID 1499087) AW	39.54	Westerham Wood SSSI (43.26ha)	The SSSI comprises several blocks of woodland listed on the Ancient Woodland Inventory.

2.10.2 Sites with predicted permanent habitat loss as a result of the Project have been identified and the impacts of vegetation removal have been assessed in Chapter 8 - Terrestrial Biodiversity (Application document 6.1). The implications of vegetation removal are explained in the individual assessments in Sections 5 and 6.

2.11 Precautionary approach

2.11.1 The precautionary approach has been adopted throughout the assessment, with key points being:

a. Precautionary measures built into the N deposition model described in Chapter 5 - Air Quality (Application Document 6.1)

b. The ‘restore’ approach has been adopted throughout, using the conservative 0.4kg N/ha/yr threshold for screening sites in for assessment (in accordance with DMRB LA 105).

c. Estimation of extent of the NAA and the use of the maximum magnitude of the increase in N deposition for assessment purposes. The maximum magnitude is the modelled N deposition at the point closest to the road and deposition rates decline with distance from the road.

d. Where nitrogen sensitive species have been recorded, the assessments assume a risk of loss of these species. This is a worst case, and subtle changes in relative abundances of different species, rather than loss of individual species in the NAA are a possible outcome.

e. Calculation of duration has used the maximum (worst-case) duration calculation for designated sites where emissions on the road network were calculated at a number of different ecological receptor points within a designated site.

f. Where there is a choice of more than one significance category (Table 3.13 of DMRB LA 108), the presumption is to assume the lower level category, on account of all the precautionary measures already adopted and listed here. However, on occasions where it is considered appropriate to select the higher level category, rationale is given. Where the choices are 'neutral or slight' the selection makes no difference to the outcome of the assessment of 'not significant'. Similarly, where the choice is between 'moderate or large' or 'large or very large' the resulting assessment will be 'significant'. However, where the choice is between 'slight or moderate' (for minor impact levels on resources of national importance or major impact levels on resources of county importance, the selection influences whether or not the impact is significant.

2.12 Limitations

2.12.1 Not all of the sites screened in for assessment have been surveyed due to safety reasons (e.g., railway embankments and motorway junctions) or lack of landowner permission for access. However, desk study data has been used to maximise the robustness of the assessment.

2.12.2 Given the number of sites to visit in one survey season, it is inevitable that some were surveyed at more optimal times than others. The dry summer of 2022 meant that sites visited later in the summer were showing signs of drought, with dry and dead vegetation. However, the data collected during site surveys, coupled with the information gathered as part of the desk study is considered sufficient to provide a representative view of habitats, distribution and sensitivity and timing of survey is not considered a limitation.

2.12.3 The method used to calculate duration of Project-related increase in N deposition produces a maximum duration of 15 years and, if the modelled emissions have not reduced to the DM value in that timeframe, the output is given as greater than 15 years and is assumed to be permanent. This approach is precautionary, as it is possible that durations of greater than 15 years could result in temporary or reversible effects.

2.12.4 The interpretation of modelling results and assessment of impacts was thorough but acknowledges the lack of quantitative data on how specific habitats (especially woodland) respond to N deposition. A comprehensive literature review in Section 4 provides contextual information for the habitats being assessed.

3 Results of screening

3.1 Construction

3.1.1 The air quality modelling results are presented in detail in Chapter 5 - Air quality (Application document 6.1) and Appendix 5.3 - Air Quality Construction Phase Results (Application document 6.3), of the Environmental Statement.

3.1.2 A summary of the construction phase screening results for the designated receptors is presented in Table 3.1. The results show that 33 of the modelled receptor locations had a predicted total deposition rate above the lower critical load, a predicted change in N deposition of more than 1% of the lower critical load and more than 0.4 kg N/ha/yr. Of these, 10 sites were also screened in for operation phase.

Table 3.1 Summary of ecological receptors with potentially significant effects during construction. Highlighted sites are those also affected during operation.

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, maximum for site)[7]	Year(s) of N dep >0.4kg N/ha/yr	Increase as % LCL
803_VT	Broad-leaved deciduous woodland	10	0.95	2026, 2027	9.5
804_VT	Broad-leaved deciduous woodland	10	1.04	2027, 2028	10.4
805_VT	Broad-leaved deciduous woodland	10	0.51	2027, 2028	5.1
Arena Essex, West Thurrock LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.65	2026, 2027	3.3
Arisdale Avenue LWS	Neutral grassland (Low and medium altitude hay meadows)	20	1.03	2025, 2026, 2027	5.2
AW_Theme_ID1420009 AW	Broad-leaved deciduous woodland	10	0.91	2025	9.1

[7] Figures are obtained from Appendix 5.3 - Air Quality Construction Phase Results (Application document 6.3), of the Environmental Statement

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, maximum for site)[7]	Year(s) of N dep >0.4kg N/ha/yr	Increase as % LCL
AW_Theme_ID1420010 AW	Broad-leaved deciduous woodland	10	0.77	2025	7.7
AW_Theme_ID1487077 AW	Broad-leaved deciduous woodland	10	0.51	2027, 2028	5.1
AW_Theme_ID1487086 AW	Broad-leaved deciduous woodland	10	0.42	2028	4.2
AW_Theme_ID1487106 AW	Broad-leaved deciduous woodland	10	0.5	2027, 2028	5.0
AW_Theme_ID1495743 AW	Broad-leaved deciduous woodland	10	2.63	2027, 2028	26.3
Brickbarn Wood and Coombe Wood, South Ockendon LWS	Meso- and eutrophic Quercus woodland	15	1.35	2025, 2026	9.0
Codham Hall Wood AW	Broad-leaved deciduous woodland	10	0.44	2028	4.4
Codham Hall Woods LWS	Broad-leaved deciduous woodland	10	0.44	2028	4.4
Codham Hall Wood West SINC	Broad-leaved deciduous woodland	10	2.63	2027, 2028	26.3
Court Wood, Shorne LWS	Broad-leaved deciduous woodland	10	0.77	2027, 2028	7.7
Cranham Hall Shaws And Pasture SINC	Broad-leaved deciduous woodland	10	2.45	2025, 2026, 2027, 2028	24.5
Hobbs Hole AW	Broad-leaved deciduous woodland	10	0.66	2027, 2028	6.6
Hobbs Hole LWS	Broad-leaved deciduous woodland	10	0.79	2027, 2028	7.9
Low Well Wood(AW_Theme_ID 1505468) AW	Broad-leaved deciduous woodland	10	0.46	2025, 2026	4.6
Low Well Wood, South Ockendon LWS	Broad-leaved deciduous woodland	10	0.46	2025, 2026	4.6

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, maximum for site)[7]	Year(s) of N dep >0.4kg N/ha/yr	Increase as % LCL
Mar Dyke LWS	Broad-leaved deciduous woodland	10	1.57	2025, 2026, 2027	15.7
MILL WOOD (AW_Theme_ID 1119931) AW	Broad-leaved deciduous woodland	10	0.77	2025	7.7
Ockendon Railsides SINC	Broad-leaved deciduous woodland	10	2.85	2025, 2026, 2027, 2028	28.5
Peartree Wood AW	Broad-leaved deciduous woodland	10	1.26	2027, 2028	12.6
Puddle Dock Angling Centre SINC	Neutral grassland (Low and medium altitude hay meadows)	20	0.65	2028	3.3
ROUND SHAW (AW_Theme_ID 1119930) AW	Broad-leaved deciduous woodland	10	0.91	2025	9.1
Shorne And Ashenbank Woods SSSI	Meso- and eutrophic Quercus woodland	15	0.63	2026	4.2
Shorne/Brewers Woods AW	Meso- and eutrophic Quercus woodland	15	0.65	2026, 2026	4.3
Straight Path Shaw LWS	Broad-leaved deciduous woodland	10	0.91	2025	9.1
Thames Chase Forest Centre SINC	Broad-leaved deciduous woodland	10	2.38	2025, 2026, 2027, 2028	23.8
Thick/Hollow Bottom Shaws LWS	Broad-leaved deciduous woodland	10	0.91	2025	9.1
Tilbury Marshes LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.4	2025	2.0

3.2 Operation

3.2.1 Table 3.2 shows that in the DS scenario, 123 sites had a predicted total N deposition rate above the lower critical load, and a predicted change in N deposition that both exceeds 1% of the lower critical load and 0.4 kg N/ha/year. The habitats identified within the designated sites that were screened in were woodland, calcareous and neutral grassland. As explained above, none of these correspond with the habitats in Table 21 of Caporn *et al.* (2016) and therefore a figure of 0.4kg N/ha/yr (which is for upland and lowland heath) is appropriate to indicate the lowest change in N deposition which could bring about the loss of one species.

3.2.2 The full set of receptor results for all of the transects is provided in Appendix 5.4 - Air Quality Operational Phase Results (Application Document 6.3) of the Environmental Statement.

3.2.3 Greater Thames Marshes NIA was screened in for assessment, but it is not feasible to carry out detailed site investigation or assessment as the NIA is 54,000ha in size and encompasses many of the designations that are assessed separately. NIAs were established to create joined up and resilient ecological networks at a landscape scale. The potential impacts of N deposition are not considered to conflict with the objectives of Greater Thames Marshes NIA.

Table 3.2 Summary of ecological receptors with potentially significant effects during operation

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
23_VT	Broad-leaved deciduous woodland	10	0.56	5.6
27_VT	Broad-leaved deciduous woodland	10	0.63	6.3
401_VT	Broad-leaved deciduous woodland	10	0.56	5.6
403_VT	Broad-leaved deciduous woodland	10	2.02	20.2
410_VT	Broad-leaved deciduous woodland	10	0.78	7.8
424_VT	Broad-leaved deciduous woodland	10	0.51	5.1
426_VT	Broad-leaved deciduous woodland	10	0.63	6.3

[8] Figures are obtained from Appendix 5.4 - Air Quality Operational Phase Results (Application Document 6.3) of the Environmental Statement

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
438_VT	Broad-leaved deciduous woodland	10	1.13	11.3
643_VT	Broad-leaved deciduous woodland	10	1.03	10.3
649_VT	Broad-leaved deciduous woodland	10	0.94	9.4
652_VT	Broad-leaved deciduous woodland	10	0.99	9.9
667_VT	Broad-leaved deciduous woodland	10	0.63	6.3
668_VT	Broad-leaved deciduous woodland	10	0.62	6.2
669_VT	Broad-leaved deciduous woodland	10	0.61	6.1
670_VT	Broad-leaved deciduous woodland	10	0.60	6.0
671_VT	Broad-leaved deciduous woodland	10	0.61	6.1
744_VT	Broad-leaved deciduous woodland	10	0.54	5.4
745_VT	Broad-leaved deciduous woodland	10	0.53	5.3
752_VT	Broad-leaved deciduous woodland	10	0.58	5.8
All Saints Grassland LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.43	2.1
ANDREWS WOOD(AW_Theme_ ID 1499246) AW	Broad-leaved deciduous woodland	10	0.56	5.6
AW_Theme_ID_1486 679 (Object ID 9096) AW	Broad-leaved deciduous woodland	10	2.06	20.6
AW_Theme_ID_1486 820 (A2/M2 ROUNDABOUT) AW	Broad-leaved deciduous woodland	10	3.21	32.1

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
AW_Theme_ID_1486860 (Shorne Woods) AW	Broad-leaved deciduous woodland	10	0.49	4.9
AW_Theme_ID_1486867 (Head Barn Wood) AW	Broad-leaved deciduous woodland	10	0.83	8.3
AW_Theme_ID_1486883 (Object ID 9151) AW	Broad-leaved deciduous woodland	10	0.85	8.5
AW_Theme_ID_1486891 (Between M2 carriageways) AW	Broad-leaved deciduous woodland	10	8.23	82.3
AW_Theme_ID_1486937 (Longhoes) AW	Broad-leaved deciduous woodland	10	2.06	20.6
AW_Theme_ID_1498304 AW	Broad-leaved deciduous woodland	10	0.50	5.0
AW_Theme_ID_1498718 AW	Broad-leaved deciduous woodland	10	1.50	15.0
AW_Theme_ID1420012 AW	Broad-leaved deciduous woodland	10	0.64	6.4
AW_Theme_ID1486951 AW	Broad-leaved deciduous woodland	10	1.20	12.0
AW_Theme_ID1493831 AW	Broad-leaved deciduous woodland	10	0.55	5.5
AW_Theme_ID1494010 AW	Broad-leaved deciduous woodland	10	0.63	6.3
AW_Theme_ID1499144 AW	Broad-leaved deciduous woodland	10	1.66	16.6
AW_Theme_ID1499145 AW	Broad-leaved deciduous woodland	10	1.66	16.6
AW_Theme_ID1499250 AW	Broad-leaved deciduous woodland	10	1.66	16.6
Barber's Wood And Lane LWS	Broad-leaved deciduous woodland	10	1.81	18.1
Barber's Wood AW	Broad-leaved deciduous woodland	10	1.81	18.1

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
Blue Bell Hill Banks And Verges LWS	Broad-leaved, mixed and yew woodland (Taxus baccata woodland)	5	2.28	45.6
Bowers Gifford Grasslands LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.41	2.1
Bridge Woods AW	Broad-leaved deciduous woodland	10	1.68	16.8
Bridge Woods, Burham LWS	Broad-leaved deciduous woodland	10	3.48	34.8
CHADWELL WOOD(AW_Theme_ID 1119923) AW	Broad-leaved deciduous woodland	10	0.45	4.5
Claylane Wood AW	Broad-leaved deciduous woodland	10	1.53	15.3
Cobham Woods SSSI	Meso- and eutrophic Quercus woodland	15	5.16	34.4
Codham Hall Wood AW	Broad-leaved deciduous woodland	10	1.20	12.0
Codham Hall Woods LWS	Broad-leaved deciduous woodland	10	1.20	12.0
CONEYEARTH/PASCALLS/HOLLOWS WOODS(AW_Theme_ID 1499437) AW	Broad-leaved deciduous woodland	10	0.74	7.4
Copped Hall Green LWS	Broad-leaved deciduous woodland	10	0.51	5.1
Court Wood, Shorne LWS	Broad-leaved deciduous woodland	10	0.51	5.1
Curtis Plantation SINC	Broad-leaved deciduous woodland	10	0.69	6.9
Cuxton Pit No. 3, Strood LWS	Broad-leaved deciduous woodland	10	2.16	21.6
DANE SHAW(AW_Theme_ID 1498350) AW	Broad-leaved deciduous woodland	10	0.42	4.2

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
Dartford Marshes LWS	Broad-leaved deciduous woodland	10	0.42	4.2
Disused Railway Cutting, Longfield LWS	Broad-leaved deciduous woodland	10	0.52	5.2
Epping Forest SAC	Broad-leaved deciduous woodland	10	1.01	10.1
Epping Forest SSSI	Broad-leaved deciduous woodland	10	1.01	10.1
Epping-Ambresbury Banks AW	Broad-leaved deciduous woodland	10	0.81	8.1
Foxburrow Wood, Upminster SINC	Broad-leaved deciduous woodland	10	0.64	6.4
Franks Wood And Cranham Brickfields SINC	Broad-leaved deciduous woodland	10	2.67	26.7
Frith Woods Etc., Kits Coty LWS	Broad-leaved deciduous woodland	10	0.54	5.4
Frith/Impton Woods AW	Broad-leaved deciduous woodland	10	3.01	30.1
Goshems Farm LWS	Broad-leaved deciduous woodland	10	1.08	10.8
Great Crabbles Wood AW	Meso- and eutrophic Quercus woodland	15	0.42	2.8
Great Crabbles Wood SSSI	Meso- and eutrophic Quercus woodland	15	0.42	2.8
Great Wood AW	Meso- and eutrophic Quercus woodland	15	5.16	34.4
Hall Wood AW	Broad-leaved deciduous woodland	10	0.62	6.2
Hall/Gravelhill Woods LWS	Broad-leaved deciduous woodland	10	0.42	4.2

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
Halling To Trottiscliffe Escarpment SSSI	Broad-leaved, mixed and yew woodland (Taxus baccata woodland)	5	5.45	109.0
Hillview SINC	Neutral grassland (Low and medium altitude hay meadows)	20	3.30	16.5
Hobbs Hole AW	Broad-leaved deciduous woodland	10	2.07	20.7
Hobbs Hole LWS	Broad-leaved deciduous woodland	10	2.68	26.8
Impton/Podkin Wood AW	Broad-leaved deciduous woodland	10	0.51	5.1
Ingrebourne Valley SINC	Broad-leaved deciduous woodland	10	1.33	13.3
Jermains Wood SINC	Broad-leaved deciduous woodland	10	0.68	6.8
Langdon Ridge SSSI	Broad-leaved deciduous woodland	10	0.62	6.2
Lea Valley SINC	Broad-leaved deciduous woodland	10	0.70	7.0
Leybourne Lakes Etc., Snodland LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.45	2.3
Linford Pit LWS	Broad-leaved deciduous woodland	10	2.11	21.1
Little Chef Pasture SINC	Broad-leaved deciduous woodland	10	0.55	5.5
Low Street Pit LWS	Broad-leaved deciduous woodland	10	16.49	164.9
Merrals Shaw (AW_Theme_ID 1486881) AW	Broad-leaved deciduous woodland	10	2.06	20.6
MILSTEAD/BASSILNE WOOD(AW_Theme_ID 1498502) AW	Broad-leaved deciduous woodland	10	0.40	4.0

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
Mintching/Kingsdown Wood AW	Broad-leaved deciduous woodland	10	0.51	5.1
Mucking Heath LWS	Broad-leaved deciduous woodland	10	3.46	34.6
Nurstead And Cozendon Woods, Nash Street LWS	Broad-leaved deciduous woodland	10	0.50	5.0
Ockendon Railsides SINC	Broad-leaved deciduous woodland	10	2.40	24.0
Parker's Shaw LWS	Broad-leaved deciduous woodland	10	0.44	4.4
Peartree Wood AW	Broad-leaved deciduous woodland	10	0.62	6.2
Pot Kiln Wood and Sickle Wood SINC	Broad-leaved deciduous woodland	10	0.74	7.4
Putt Wood AW	Broad-leaved deciduous woodland	10	0.51	5.1
Rainbow Shaw LWS	Broad-leaved deciduous woodland	10	8.39	83.9
Rede Common LNR	Broad-leaved deciduous woodland	10	1.12	11.2
REED'S SHAW(AW_Theme_ID 1498441) AW	Broad-leaved deciduous woodland	10	0.47	4.7
River Medway And Marshes, Wouldham LWS	Neutral grassland (Low and medium altitude hay meadows)	20	0.85	4.2
River Medway Between Cuxton And Temple Marsh LWS	Neutral grassland (Low and medium altitude hay meadows)	20	4.44	22.2
River Shuttle SINC	Broad-leaved deciduous woodland	10	0.50	5.0
Romford To Harold Wood Railsides SINC	Broad-leaved deciduous woodland	10	2.37	23.7
Shales More AW	Broad-leaved deciduous woodland	10	0.67	6.7

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
Shales More LWS	Broad-leaved deciduous woodland	10	0.67	6.7
Shorne And Ashenbank Woods SSSI	Broad-leaved deciduous woodland	10	1.65	16.5
Shorne/Brewers Woods AW	Broad-leaved deciduous woodland	10	0.44	4.4
St Michael And All Angels Church LWS	Neutral grassland (Low and medium altitude hay meadows)	20	1.95	9.7
Strawberry Farm Wood SINC	Broad-leaved deciduous woodland	10	2.56	25.6
Terrels Heath Grays LWS	Broad-leaved deciduous woodland	10	0.41	4.1
Thames Chase Forest Centre SINC	Broad-leaved deciduous woodland	10	2.37	23.7
The Oaks LWS	Broad-leaved deciduous woodland	10	0.41	4.1
The Osiers AW	Broad-leaved deciduous woodland	10	1.34	13.4
The Selvage LWS	Broad-leaved deciduous woodland	10	0.48	4.8
Titsey Woods SSSI	Meso- and eutrophic Quercus woodland	15	0.50	3.3
Tylers Wood SINC	Broad-leaved deciduous woodland	10	0.68	6.8
Upminster Lodge Farm Horse Field SINC	Neutral grassland (Low and medium altitude hay meadows)	20	0.67	3.3
Upper Brooms Wood AW ((AW_Theme_ID_14 98405 (Object ID 11581))	Broad-leaved deciduous woodland	10	1.00	10.0
Westerham Wood SSSI	Broad-leaved deciduous woodland	10	0.44	0.4

Site Name	Modelled Habitat Type	LCL for modelled habitat type (kg N/ha/yr)	N deposition increase (DS-DM, max for site)[8]	Increase as % LCL
WESTERHAM WOOD(AW_Theme_ ID 1501398) AW	Broad-leaved deciduous woodland	10	0.44	0.4
Woodlands West of Shoreham LWS	Broad-leaved deciduous woodland	10	0.56	5.6
Wouldham To Detling Escarpment SSSI	Broad-leaved, mixed and yew woodland (Taxus baccata woodland)	5	1.54	30.7
Yaugher Wood (AW_Theme_ID 1498451) AW	Broad-leaved deciduous woodland	10	0.54	5.4
Yaugher Woods LWS	Broad-leaved deciduous woodland	10	0.54	5.4

4 Literature review to inform the assessment

4.1 Introduction

4.1.1 This section presents the current knowledge of the potential effects of N deposition on the habitats present within the sites screened in for assessment. Scientific research on the effects of N deposition on terrestrial ecosystems has been ongoing in Europe for decades and underpins the determination of critical loads for different habitats. There are a number of published papers and reports that review the current scientific understanding, both in general e.g., Bobbink et al. (2010), Clark et al. (2013) and UKREATE (2007) and with particular reference to roads, e.g., Bignal et al. (2004) and Natural England (2016). Reports published by the Institute of Air Quality Management (IAQM) (2020) and CIEEM (2021) provide guidance on the ecological assessment of air quality impacts.

4.1.2 N deposition affects terrestrial biodiversity and vegetation through four primary mechanisms:

a. Eutrophication (nutrient enrichment)

b. Acidification of soil

c. Exacerbation of secondary stresses such as frost, drought tolerance and herbivory

d. Direct toxicity at high concentrations close to emissions sources (particularly bryophytes and lichens)

4.1.3 The effects of N deposition are mediated through complex interactions between biotic and abiotic factors. Clark et al. (2013) explain that the magnitude and nature of effects on ecosystems are extremely variable and depend on interactions between other factors such as climate, disturbance and vegetation composition. This means that attributing observable vegetation change to N deposition alone is extremely difficult. In line with DMRB LA 105, the focus of this assessment is the potential for change in vegetation composition and therefore does not specifically address the mechanisms listed above, although these may themselves be the cause of changes in vegetation composition.

4.2 Potential effects of nitrogen deposition on woodland

4.2.1 Most of the designated habitats under consideration in this assessment are woodland of the broad habitat type ‘broadleaved, mixed and yew woodland’. Most of the sites are classified as the priority habitat type ‘broadleaved deciduous woodland’, with a critical load for N deposition of 10-20kg N/ha/yr. Sites designated as SSSI have site-specific critical loads listed on APIS and these figures have been used where applicable. For example, the site-specific critical load for Cobham Woods SSSI is given as 15-20kg N/ha/yr because this site supports meso- and eutrophic oak woodland. Sites that support yew woodland (Wouldham to Detling Escarpment SSSI and Halling to Trottiscliffe Escarpment SSSI) have site-specific critical loads of 5-15 kg N/ha/yr, as this is the critical load assigned to yew-dominated (coniferous) woodland.

4.2.2 The critical load takes into account the sensitive lower plant communities often present in woodlands and the changes in soil chemistry associated with acidification and eutrophication which can lead to nitrogen leakage, either though leaching (nitrate) or emissions of the greenhouse gases NO or NO_2.

4.2.3 A summary of the scientific research on the potential effects on this type of woodland habitat is provided on the APIS website (CEH, 2022) and the following text is based on the information therein. N deposition is not believed to have a direct, major effect on tree growth in the UK but it has a variety of indirect effects. Nitrogen can affect woodlands through eutrophication and acidification which can make the habitat vulnerable to a range of indirect injurious effects. The different components of woodland ecosystems have different sensitivities to nitrogen and respond in different ways. Tree species form the canopy layer, with an under storey of woody shrubs and a ground layer of forbs and grasses, often with lower plants such as mosses and lichens carpeting the forest floor. Below ground there are mycorrhizal fungi associated with plant roots which are especially sensitive to N deposition (but the effects won't be seen unless specialist surveys are undertaken). In addition, the trees may support epiphytic communities of bryophytes and algae. The structural complexity of woodlands means that they provide a diverse habitat for wildlife, especially insects, birds and small mammals. N deposition can compromise this biodiversity value through changes in cover (protection), food type, quantity and quality, changes in the overall environment for predators, and timing of food source availability via effects on phenology (bud burst, bud set, flowering).

4.2.4 Woodlands tend to intercept larger amounts of both dry and wet N deposition than less rough surfaces, e.g., grasslands (Bobbink *et al*., 2010). This is particularly the case for woodland edges, which experience the highest N deposition, especially where there is a local source of gaseous nitrogen, e.g., roads and / or intensive agricultural areas. Therefore, there is often a gradient of N deposition declining from the woodland edge (Spangenberg and Kölling, 2004).

4.2.5 It is widely recognised that the effect of N deposition on woodland vegetation communities is poorly understood and that there are knowledge gaps in the literature (Jones *et al*., 2018; Caporn *et al*., 2016). This is due to many factors complicating the study of woodlands. The canopy can have a strong influence and can intercept rainfall, pollution and light before it reaches the ground flora. Variables such as woodland management and browsing pressure are also considerable factors (Caporn *et al*., 2016). A study looking at N deposition on woodlands compared the same sites three decades apart and found little to no change in species richness but noted minor compositional changes with nitrogen-loving species such as cleavers and common nettle responding positively to nitrogen. It was also noted that woodland plants occupy a middle to upper zone on the Ellenberg nitrogen value scale and therefore may be better adapted to increases in available nitrogen than other plant communities. (Caporn, 2016; Kirby *et al*., 2005).

4.2.6 Attributing possible effects seen in the field to N deposition is not always possible as some of the effects are not easily distinguished from the effects of management (Jones et al., 2018), especially where this involves changing light levels e.g., thinning or over-grazing. Inappropriate or insufficient management and wind throw can simulate the effects of increased nitrogen and may result in very similar outcomes to eutrophication, e.g., an increase in grass growth.

4.2.7 Furthermore, not all indicators of exceedance of the critical load as listed on APIS are easily recorded in the field, such as: changes in soil processes; nutrient imbalance; altered composition of mycorrhiza; changes in soil nutrient levels; and increases in tree foliar and litter N concentrations and P/N ratio. The indicators of nitrogen enrichment most likely to be noticeable on field survey are changes in ground vegetation composition towards dominance by nitrophilic species (De Vries *et al*., 2007) and an increased likelihood of algal growth (Achermann & Bobbink, 2003).

4.3 Potential effects of nitrogen deposition on veteran trees

4.3.1 There is no critical load as such for veteran trees and therefore these receptors have been assigned the same critical load range as broadleaved, mixed and yew woodland of 10-20kg N/ha/yr. There is little or no scientific literature on the specific impacts of N deposition on veteran trees. However, APIS reports that oak foliage may be less susceptible to pests than other species following N enrichment, due to its relatively high tannin content.

4.3.2 Veteran and ancient trees often support lower plant communities that are susceptible to changes in N deposition e.g., lungworts *Lobaria* spp. and beard lichens *Usnea* spp.). Lichens on trees provide shelter, food, and vital microhabitats for invertebrates, and are considered to contribute to wider ecosystem services, for example in carbon cycling and water retention.

4.4 Potential effects of nitrogen deposition on neutral grassland

4.4.1 A critical load for N deposition of 20-30kg N/ha/yr is used for neutral grasslands, based on the values given for ‘low and medium altitude hay meadows’. However, it is important to note that hay meadows are low-nutrient systems and are more sensitive to N deposition than most lowland mesotrophic grasslands (such as those being considered here) that are not managed in the same manner as meadows. Therefore, the critical load of 20-30kg N/ha/yr is a conservative estimate for the somewhat nutrient-enriched grasslands present in the study area for the Project and it is possible that many of these grasslands are not particularly nitrogen sensitive. These mesotrophic grasslands are found on fertile lowland soils and in some cases receive (or have received) deliberate input of fertilizer. The relatively low levels added by atmospheric N deposition are likely to have little additional effect on the sward (Maskell et al., 2010).

4.4.2 A summary of the scientific research on the potential effects on low and medium altitude hay meadows is provided on the APIS website and the following text, where it is considered applicable to more typically nutrient-enriched neutral grasslands, is based on the information therein. N deposition causes eutrophication (nutrient enrichment) and acidification of low-nutrient grasslands.

Acidification can lead to high concentrations of potentially toxic NH_4^+ ions and increase the solubility of toxic cations e.g., aluminium (Clark et al., 2013).

4.4.3 In general, species diversity in grasslands is negatively correlated with nutrient status and hence the grasslands in the study area of the Project are already lower in diversity than a typical hay meadow. In low-nutrient systems, an increase in N deposition is likely to cause a decline in species diversity, enabling the fast-growing, robust and species to out-compete the low-growing forbs that are adapted to low nutrient conditions (DeVries et al. 2007). It is of note that other factors can also cause the nutrient status of grasslands to increase such as lack of or unsuitable management, development of scrub, unsuitable grazing regimes and recreation (e.g., dog walking) (Lake, 2015).

4.4.4 Indicators of nitrogen enrichment include an increase in canopy height and an increase in the proportion of productive, tall grasses, with a concurrent reduction in proportion and diversity of fine leaved grasses and forbs. There is likely to be a reduction in the species richness of forb species, particularly those with a preference for wetter conditions. Below-ground changes include a decrease in soil pH, accumulation of NH_4^+ in soil solution, an increase in acid cations e.g., Al and Mn and a likely increase in rates of mineralization of organic N, conversion to NH_4^+ and then nitrification and possibly loss as the greenhouse gas N_2O.

4.5 Potential effects of nitrogen deposition on calcareous grassland

4.5.1 Calcareous grasslands often have high levels of diversity due to supporting species that are adapted to low nutrient conditions. Nutrient enrichment can cause certain species to thrive at the expense of others causing a net loss of species diversity (Emmett et al., 2011 and Stevens et al., 2011). A critical load for N deposition of 15-25kg N/ha/yr is used for calcareous grasslands, based on the values for ‘sub-Atlantic semi-dry calcareous grassland’ given in Hall et al. (2015). Many of the grasslands in the study area for the Project have been subject to historic N deposition in exceedance of the critical load and may already be in a nutrient enriched state. For context, 71.5% of calcareous grasslands in the UK are already in exceedance of the critical load (RoTAP, 2012).

4.5.2 Key indicators of critical load exceedance on calcareous grassland include loss of total species diversity, decrease in forb cover and increase in graminoid cover. It has been noted that calcareous grasslands could be naturally buffered against the acidification effects of N deposition (RoTAP, 2012).

4.5.3 A summary of the scientific research on the potential effects on calcareous grasslands is provided on the APIS website and the following text, where it is considered applicable to calcareous grasslands, is based on the information therein. N deposition causes eutrophication (nutrient enrichment) and acidification of low-nutrient grasslands. Acidification can lead to high concentrations of potentially toxic NH4+ ions and increase the solubility of toxic cations e.g., aluminium (Clark et al., 2013).

4.5.4 In general, species diversity in grasslands is negatively correlated with nutrient status and hence the grasslands in the study area of the Project may already be lower in diversity than a typical calcareous grassland due to high levels of N deposition in south-east England. In low-nutrient systems, an increase in N deposition is likely to cause a decline in species diversity, enabling the fast-growing, robust and species to out-compete the low-growing forbs that are adapted to low nutrient conditions (DeVries et al. 2007). It is of note that other factors can also cause the nutrient status of grasslands to increase such as lack of or unsuitable management, development of scrub, unsuitable grazing regimes and recreation (e.g., dog walking) (Lake, 2015).

4.5.5 Indicators of nitrogen enrichment include an increase in canopy height and an increase in the proportion of productive, tall grasses, with a concurrent reduction in proportion and diversity of fine leaved grasses and forbs. There is likely to be a reduction in the species richness of forb species, particularly those with a preference for wetter conditions. Below-ground changes include a decrease in soil pH, accumulation of NH4+ in soil solution, an increase in acid cations e.g., Al and Mn and a likely increase in rates of mineralization of organic N, conversion to NH4+ and then nitrification and possibly loss as the greenhouse gas N2O.

4.6 Responses to increased nitrogen deposition above the critical load

4.6.1 Although UK emissions of nitrogen oxides have fallen in the last two decades (Defra, 2022), it is likely that sites in the study area of the Project have been subject to historic levels of deposition above the critical load. Given that the current background deposition at all the sites (and veteran trees) screened in for ecological assessment already exceeds the higher critical load for the relevant habitat type, it is possible that changes in nutrient cycling, vegetation composition and ecosystem function have already occurred at these sites. These sites are likely to already be showing symptoms of N deposition throughout and increased graminoid and nitrophilous species cover may already be apparent in affected areas (De Vries *et al*., 2007). This shifted baseline could make further changes in vegetation from incremental additions of nitrogen difficult to recognise in the field. Therefore, it is important to understand the evidence (if any) of further changes that could be the result of additional nitrogen above the critical load.

4.6.2 At levels of N deposition at and above the upper end of the critical load, additional long-term increments of nitrogen are generally associated with further declines in species richness. However, the incremental effect of long-term N deposition reduces as deposition levels increase above the upper end of the critical load for a habitat. Less polluted sites were therefore more sensitive to increases in N deposition, whereas sites already receiving high levels of N deposition had already experienced a loss in species diversity. In addition, some species, especially graminoids (grasses, sedges, rushes) increase their cover in high N deposition scenarios and this can result in further losses of species that are sensitive to enrichment (Caporn *et al*., 2016).

4.6.3 Some of the N deposition studies on vegetation change in woodlands have contradictory outcomes around which species were found to respond to N deposition (see Pitcairn *et al*., 1998 & Kirby *et al*., 2005). This lack of a clear relationship between species richness and N deposition makes assuming a dose-response relationship difficult (Caporn *et al*., 2016).

5 Baselines and impact assessments of sites screened in for construction only

5.1 Introduction

5.1.1 The baseline descriptions and impact assessments for sites screened in for construction only are presented in the tables below. Table 3.1 indicates that 33 of the modelled receptor locations had a predicted total deposition rate above the lower critical load, with both a predicted change in N deposition of more than 1% of the lower critical load and of more than 0.4 kg N/ha/yr. These comprise one SSSI, 13 ancient woodlands, 16 LWS (including five Sites of Importance for Nature Conservation (SINC)) and three veteran trees. Ten sites were also screened in for potential impacts during operation, as follows:

a. Codham Hall Woods LWS

b. Codham Hall Wood AW

c. Court Wood, Shorne LWS

d. Hobbs Hole AW

e. Hobbs Hole LWS

f. Ockendon Railsides SINC

g. Peartree Wood AW

h. Shorne And Ashenbank Woods SSSI

i. Shorne/Brewers Woods AW

j. Thames Chase Forest Centre SINC

5.1.2 The assessment of construction phase impacts on the ten sites that are also screened in for operation are included with the assessment of operation impacts so that the overall effect of the Project on the site is assessed.

5.2 Veteran trees

5.2.1 The three trees (803_VT, 804_VT and 805_VT) that are screened in for potential impacts during the construction phase are screened out for operation impacts. Therefore, impacts on veteran trees are temporary in nature, with modelling of each year of the construction phase predicting a maximum of two years of N deposition greater than 0.4kg N/ha/yr for all trees (Table 3.1). The range of increase in N deposition is between 0.51 and 1.04kg N/ha/yr. The physical characteristics of veteran trees such as age, size, structure and presence of dead and decaying wood will not be affected by increases in N deposition of this magnitude of such short duration. Therefore, the impact level for all three trees is assessed as no change, which results in a neutral effect (not significant).

5.3 Arena Essex, West Thurrock LWS

Baseline

Table 5.1. Arena Essex, West Thurrock LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	43_LWS_CON
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	24.37
Site description - desk study:	The description in the citation for the Arena Essex, West Thurrock LWS (undated) is as follows: This site has been selected on account of its very significant population of broad-leaved cudweed (*Filago pyramidata*). This national Red Data Book (Endangered) plant is known from less than a dozen sites nationally and is only found in Essex at this location and one other nearby site. It is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). broad-leaved cudweed is a plant of arable land and other disturbed habitats. This is a large site, with a good deal of actual and potential habitat for this species. As such, the use of the Arena Essex land for a variety of motor sports activities is not necessarily detrimental to its survival and, indeed, may be instrumental in maintaining some bare areas where it can colonise and spread. In general, maintaining a mosaic of recently disturbed areas with other areas of sparsely vegetated ground will be important for the survival of this plant. It is likely that this site will also prove to be of great interest for brownfield invertebrate assemblages, but this does not currently form the basis of its identification as a LWS.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.2 Arena Essex, West Thurrock LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 24.63 DM: 26.6 DS: 27.25
Construction - Ndep increase (max for site) kg N/ha/yr	0.65
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	3.25
Construction - increase over 0.4 kg N/ha/yr	0.25
Construction - impact extent (ha)	0.57
Construction - impact extent (% of site)	2.33
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.3.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.65 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports a mix of grassland and scrub. The LCL for this habitat is 20kg N/ha/yr and the increase in N deposition is 3.3% of this LCL. The site citation indicates presence of a significant population of broad-leaved cudweed (*Filago pyramidata*), which is an indicator of more or less infertile sites and potentially sensitive to N deposition. The area affected is 2% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. It is of note that the DS N deposition is within the CL range for this habitat. Despite the possible presence of species sensitive to nitrogen, the very short-lived increase in N deposition within the CL range is unlikely to affect the integrity of the site. Therefore, the impact level has been assessed as negligible. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

5.4 Arisdale Avenue LWS

Baseline

Table 5.3 Arisdale Avenue LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	27_LWS_CON
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	16.63

Site description - desk study:	Arisdale Avenue LWS description (undated) states the following: 'This brownfield site comprises rough, weedy and flower-rich grassland and a small reed-filled hollow. It is of value for its invertebrate assemblage, amongst which the small mining bee (*Andrena alfkenella*) is of particular interest amongst a list of 15 Essex Red Data List species. Also present is the Long-winged Cone-head bush-cricket (*Conocephalus discolor*) and the national BAP bumblebee (*Bombus humilis*). This latter species requires large areas of flower-rich grassland in which to forage and rough grassland for nest construction. The Long-winged cone-head requires areas of tall, un-intensively managed grassland and, although expanding its range nationally, remains relatively uncommon in Essex. Selection Criteria: SCr11; SCr12 Condition and Proposed Management: This is one of a suite of "early succession" habitats found in the borough, which favour the establishment of invertebrates that favour bare ground and/or flower-rich habitats. Management should aim to maintain the status quo, with large areas of tall, weedy grassland. Within this, the reed-filled hollow could be enhanced as a small wetland feature. This land may well prove to be of importance for reptiles.'
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.4 Arisdale Avenue LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 20.77 DM: 20.38 DS: 21.31
Construction - Ndep increase (max for site) kg N/ha/yr	1.03

Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	5.15
Construction - increase over 0.4 kg N/ha/yr	0.63
Construction - impact extent (ha)	0.74
Construction - impact extent (% of site)	4.42
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	3
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.4.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.03 kg N/ha/yr. Site description suggests that the NAA supports rough, weedy and flower-rich grassland and a small reed-filled hollow. It is of value for its invertebrate assemblage which requires large areas of un-intensively managed grasslands. The LCL for this habitat is 20kg N/ha/yr and the increase in N deposition is 5.2% of this LCL. The area affected is 4% of the site and the duration of change is for 3 years of the construction phase, so is temporary and reversible. Considering that the DS N deposition is within the CL range for this habitat, the small area affected and that rough grassland is typically mesotrophic and not particularly sensitive to nitrogen, it is unlikely that the predicted increase in N deposition would cause an observable change in vegetation composition. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

5.5 AW_Theme_ID1420009 AW

Baseline

Table 5.5 AW_Theme_ID1420009 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	85_LWS_AW
Resource importance:	National
Overlapping site:	Thick/Hollow Bottom Shaws LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	0.1
Site description - desk study:	This ancient and seminatural woodland is list on the Ancient Woodland Inventory and shares its boundary with Thick/ Hollow Shaws LWS (in the area within 200m of the construction ARN) and links to Hollow Bottom Shaw to the south. The LWS description did not relate specifically to this wood, however a review of aerial imagery indicated that it is broadly similar to the adjacent Hollow Bottom Shaw. The LWS description for Hollow Bottom Shaw stated that it has scattered pedunculate oak and ash, with bramble (*Rubus fruticosus agg.*) covering extensive areas below, whilst greater stitchwort (*Stellaria holostea*) is prominent in grassy glade areas found within surrounding scrub.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.6 AW_Theme_ID1420009 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 46.12 DM: 43.92 DS: 44.83
Construction - Ndep increase (max for site) kg N/ha/yr	0.91
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	9.1
Construction - increase over 0.4 kg N/ha/yr	0.51
Construction - impact extent (ha)	0.1
Construction - impact extent (% of site)	96.88
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.5.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.91 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broad-leaved deciduous woodland. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 9.1% of this LCL. The area affected is 97% of the site and the duration

of change is for 1 year of the construction phase, so is temporary and reversible. Although the percentage of the site affected is high, this AW woodland block is linked to a larger AW block to the south and despite a separate listing in the Ancient Woodland Inventory the woodland is continuous. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.6 AW_Theme_ID1420010 AW

Baseline

Table 5.7 AW_Theme_ID1420010 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	91_LWS_AW
Resource importance:	National
Overlapping site:	Straight Path Shaw LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	0.21
Site description - desk study:	This site is described in the Ancient Woodland Inventory as ancient and semi-natural wood, overlapping with wood-pasture and parkland BAP (Biodiversity Action Plan) Priority Habitat. Aerial photographs show that this small patch of woodland lies in the southernmost part of a wider network of ancient woodland and despite it being mapped as a separate patch, it connects to the wooded areas to the north through a narrow strip of woodland along a stream. Adjacent to the A127 carriageway to the south and open fields to the west and east of the woodland.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.8 AW_Theme_ID1420010 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 53.03 DM: 49.81 DS: 50.58
Construction - Ndep increase (max for site) kg N/ha/yr	0.77
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	7.7
Construction - increase over 0.4 kg N/ha/yr	0.37
Construction - impact extent (ha)	0.11
Construction - impact extent (% of site)	52.24
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.6.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.77 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland and this small patch of

woodland lies in the southernmost part of a wider network of ancient woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 7.7% of this LCL. The area affected is 52% of the site and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.7 AW_Theme_ID1487077 AW

Baseline

Table 5.9 AW_Theme_ID1487077 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	176_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.51
Site description - desk study:	An area of ancient woodland and semi-natural woodland listed on the Ancient Woodland Inventory. Adjacent to the M20 carriageway to the south with some visible parching between to woodland and the road. Aerial photographs show that here is a large park to the east between the woodland and a housing development. The park has a pond/waterbody present and is highly likely to be used by the public on a regular basis. There are no visible gaps in the woodland but there is potentially scrub in many areas. There is an additional wooded area to the north with several gaps in it, suggesting recreational use. To the west there is an open field. The aerial imagery shows the waterbody to be partially dry.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.10. AW_Theme_ID1487077 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 61.19 DM: 60.49 DS: 60.92
Construction - Ndep increase (max for site) kg N/ha/yr	0.51
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	5.1
Construction - increase over 0.4 kg N/ha/yr	0.11
Construction - impact extent (ha)	0.2
Construction - impact extent (% of site)	39.49
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.7.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.51 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 5.1% of this LCL. The area affected is 39% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.8 AW_Theme_ID1487086 AW

Baseline

Table 5.11 AW_Theme_ID1487086 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	179_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.83
Site description - desk study:	An area of ancient woodland and Semi-natural woodland listed on the Ancient Woodland Inventory immediately north of the M20. This site is linked to AW_Theme_ID1487106 AW at the south west corner. The review of aerial imagery showed the area to be predominantly deciduous woodland, surrounded by fields with pathways through a section of the woodland indicating some level of recreational use. Aerial photos show that there is some patchy woodland to the south adjacent to the woodland that connects it to a larger woodland to the southwest of the area, as well as patch of scrub with vehicle tracks visible. There is a settlement to the northwest of the area and a small business centre to the west.
Site condition - As described in citation/by site manager:	Unknown

Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.12 AW_Theme_ID1487086 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 58.98 DM: 57.98 DS: 58.4
Construction - Ndep increase (max for site) kg N/ha/yr	0.42
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	4.2
Construction - increase over 0.4 kg N/ha/yr	0.02
Construction - impact extent (ha)	0.01
Construction - impact extent (% of site)	0.3
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.8.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.42 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 4.2% of this LCL. The area affected is less than 1% of the site (0.005 ha) and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Considering the area affected, the short-lived increase in N deposition and the precautionary approach applied in the absence of site survey data, it is unlikely that the predicted increase in N deposition would cause an observable change in vegetation composition. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

5.9 AW_Theme_ID1487106 AW

Baseline

Table 5.13 AW_Theme_ID1487106 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	178_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.5
Site description - desk study:	Ancient and semi-natural Woodland adjacent to the M20. The area consists of mainly deciduous woodland. This site is linked to AW_Theme_ID1487086 AW at the north east corner. There are pathways available through the woodland connecting the mentioned woodland to the southeast of the area. Aerial photos show that there is some patchy woodland, as well as patch of scrub with vehicle tracks visible adjacent to the site. There is a settlement (Ryarsh) to the northwest of the area and a small business centre to the west.

Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.14 AW_Theme_ID1487106 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 61.05 DM: 60.36 DS: 60.78
Construction - Ndep increase (max for site) kg N/ha/yr	0.5
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	5.0
Construction - increase over 0.4 kg N/ha/yr	0.1
Construction - impact extent (ha)	0.32
Construction - impact extent (% of site)	21.49
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant

Compensation proposed	Not required

Assessment Rationale

5.9.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.50 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 5.0% of this LCL. The area affected is 21% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.10 AW_Theme_ID1495743 AW

Baseline

Table 5.15 AW_Theme_ID1495743 AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	609a_SINC
Resource importance:	National
Overlapping site:	Codham Hall Wood West SINC
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.51
Site description - desk study:	An area of ancient woodland and semi-natural woodland listed on the Ancient Woodland Inventory shares a boundary with Codham Hall Wood West SINC, for which site description (2006) is as follows: An ancient wood of oak and hornbeam that also contains a plenty of wild service-trees. An area of ancient hornbeam (*Carpinus betulus*) coppice with pedunculate oak (*Quercus robur*) standards. The ground flora is dominated by bramble (*Rubus fruticosus agg.*) and bluebell (*Hyacinthoides non-scripta*), and wild service-tree (*Sorbus torminalis*) is frequent along the bank forming the western boundary of the wood.

Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.16 AW_Theme_ID1495743 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.49 DM: 44.19 DS: 46.72
Construction - Ndep increase (max for site) kg N/ha/yr	2.63
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	26.3
Construction - increase over 0.4 kg N/ha/yr	2.23
Construction - impact extent (ha)	2.04
Construction - impact extent (% of site)	81.33
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant

Compensation proposed	Not required

Assessment Rationale

5.10.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 2.63kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 26.3% of this LCL. The site description for the site indicates that species present (hornbeam, pedunculate oak, bramble, bluebell, and service-tree) are indicators of sites of intermediate fertility (Ellenberg N indicator values of 5-6). The area affected is 81% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.11 Brickbarn Wood and Coombe Wood, South Ockendon LWS

Baseline

Table 5.17 Brickbarn Wood and Coombe Wood, South Ockendon LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	44_LWS_CON
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	10.62

Site description - desk study:	The citation site description for Brickbarn Wood and Coombe Wood, South Ockendon LWS (undated) is as follows: This site comprises a small area of apparently ancient woodland, surrounded by secondary wood and with an important open grassland/scrub zone along the southern and eastern boundaries. The canopy is mainly pedunculate oak (*Quercus robur*) with a little ash (*Fraxinus excelsior*) and with hazel (*Corylus avellana*), hawthorn (*Crataegus monogyna)* and elder (*Sambucus nigra*) forming the understorey. Deadly nightshade (*Atropa belladonna*) is of interest in the woodland flora. In undisturbed areas bramble (*Rubus fruticosus agg.*) covers much of the ground layer, but elsewhere a diverse if occasionally sparse woodland flora includes pignut (*Conopodium majus*), bluebell (*Hyacinthoides non-scripta*), primrose (*Primula vulgaris*) and greater stitchwort (*Stellaria holostea*). The southern disturbed grassland area is of note for the localised abundance of broad-leaved cudweed, a national Red Data Book (Endangered) plant known from less than a dozen sites nationally and is only found in Essex at this location and Arena Essex to the south. It is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). This grassland zone includes several chalk grassland species, including wild liquorice (*Astragalus glycyphyllos*), yellow-wort (*Blackstonia perfoliata*) and carline thistle (*Carlina vulgaris*), as well as areas of acid grassland where sand caps the underlying chalk. The site is also of geological interest for the numerous Sarsen Stones to be found along the southern margin. The quality of the wood is being periodically impaired by the intrusion of grazing livestock from the Mar Dyke grasslands to the north. The site should be fenced to prevent future bark-stripping from the trees. There may be a need to undertake periodic scrub control along the southern grassland margin.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.18 Brickbarn Wood and Coombe Wood, South Ockendon LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland

LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 61.91 DM: 58.31 DS: 59.54
Construction - Ndep increase (max for site) kg N/ha/yr	1.35
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	13.5
Construction - increase over 0.4 kg N/ha/yr	0.95
Construction - impact extent (ha)	0.72
Construction - impact extent (% of site)	6.81
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.11.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.35 kg N/ha/yr. The citation describes this site as supporting oak and ash woodland; however, a precautionary approach has been applied and it has been modelled as broadleaved deciduous woodland. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 13.5% of this LCL. Species of interest in woodland areas include deadly nightshade (indicator of sites of intermediate to high fertility), while disturbed grassland in the south is of note for the localised abundance of broad-leaved cudweed (indicator of more or less infertile sites and potentially sensitive to N deposition). The area

affected is 7% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Given the small area affected and the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a neutral effect (not significant).

5.12 Codham Hall Wood West SINC

Baseline

Table 5.19 Codham Hall Wood West SINC: Baseline

Designation:	SINC
AQ (Construction) model point codes:	609a_SINC
Resource importance:	County
Overlapping site:	AW_ThemeID1495743 AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.52
Site description - desk study:	The citation site description (2006) for Codham Hall Wood West SINC is as follows: An ancient wood of oak and hornbeam that also contains a plenty of wild service-trees. An area of ancient hornbeam (*Carpinus betulus*) coppice with pedunculate oak (*Quercus robur*) standards. The ground flora is dominated by bramble (*Rubus fruticosus agg*.) and bluebell (*Hyacinthoides non-scripta*), and wild service-tree (*Sorbus torminalis*) is frequent along the bank forming the western boundary of the wood. The SINC boundary coincides with the area listed on the Ancient Woodland Inventory (AW_ThemeID1495743 AW).
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.20 Codham Hall Wood West SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.49 DM: 44.19 DS: 46.72
Construction - Ndep increase (max for site) kg N/ha/yr	2.63
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	26.3
Construction - increase over 0.4 kg N/ha/yr	2.23
Construction - impact extent (ha)	2.06
Construction - impact extent (% of site)	81.43
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.12.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 2.63kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat. The LCL for this

habitat is 10kg N/ha/yr and the increase in N deposition is 26.3% of this LCL. The site description for the site indicates that species present (hornbeam, pedunculate oak, bramble, bluebell, and service-tree) are indicators of sites of intermediate fertility (Ellenberg N indicator values of 5-6). The survey data from Codham Hall Wood AW and Codham Hall Woods LWS is also likely to be of relevance as these sites were a contiguous woodland before the construction of the M25. The survey indicated that species typical of fertile conditions were dominant and wood anemone was the only species potentially sensitive to nitrogen. The area affected is 81% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county or metropolitan value could be either neutral or slight. Given that a high proportion of the site is affected, it is considered precautionary to assess the effect as slight adverse (not significant).

5.13 Cranham Hall Shaws And Pasture SINC

Baseline

Table 5.21 Cranham Hall Shaws and Pasture SINC: Baseline

Designation:	SINC
AQ (Construction) model point codes:	3_LWS_CON
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	10.81
Site description - desk study:	Cranham Hall Shaws and Pasture SINC site description (last updated in 2006) is as follows: An area of traditional countryside with pasture, rich hedges, a pond and two small woods. Habitats include ancient woodland, Pond/lake, scrub, and semi-improved neutral grassland. This is a mosaic of habitats, consisting of a sizeable horse field with rich hedges and a pond, and two small areas of woodland. Together these habitats are of value to a variety of birds and invertebrates and possibly amphibians, as well as having botanical interest. The horse field is moderately species-rich, with common wildflowers such as autumn hawkbit

	(*Leontodon autumnalis*), bird's-foot-trefoil (*Lotus corniculatus*), red bartsia (*Odontites verna*) and selfheal (*Prunella vulgaris*) abundant throughout, and common knapweed (*Centaurea nigra*) locally so. The sward is dominated by crested dog's-tail (*Cynosurus cristatus*) and meadow barley (*Hordeum secalinum*) with much glaucous sedge (*Carex flacca*) and with patches of creeping bent (*Agrostis stolonifera*) and rye-grass (*Lolium perenne*). Open scrub, mostly in the southern part of the field, is predominantly hawthorn (*Crataegus monogyna*) with occasional blackthorn (*Prunus spinosa*) and dog rose (*Rosa canina*). The hedge forming the eastern boundary appears naturally rich, mostly hawthorn with common buckthorn (*Rhamnus cathartica*), dog and field roses (*Rosa arvensis*), field maple (*Acer campestre*), dogwood (*Cornus sanguinea*) and spindle (*Euonymus europaeus*). There are equally rich hedges on the opposite side of Pike Lane. A pond in the centre of the field has poached margins and abundant spiked water milfoil (*Myriophyllum spicatum*). The woodlands are dominated by ash (*Fraxinus excelsior*) or oak (*Quercus robur*) and include large multi stemmed field maple. There is a significant amount of dead wood. The shrub layer is dense and includes both common and Midland hawthorns (*C. laevigata*) and abundant blackthorn at the margins. Bluebell (*Hyacinthoides non-scripta*) and red campion (*Silene dioica*) are frequent in both areas, in a carpet of bramble (*Rubus fruticosus agg.*), cow parsley (*Anthriscus sylvestris*), ivy (*Hedera helix*), ground ivy (*Glechoma hederacea*), and nettle (*Urtica dioica*).
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.22 Cranham Hall Shaws and Pasture SINC: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 32.79 DM: 31.99 DS: 34.17

Construction - Ndep increase (max for site) kg N/ha/yr	2.45
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	12.25
Construction - increase over 0.4 kg N/ha/yr	2.05
Construction - impact extent (ha)	1.19
Construction - impact extent (% of site)	10.97
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.13.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 2.45 kg N/ha/yr. The citation and a review of aerial imagery suggests that the NAA supports broad-leaved deciduous woodland, wetland, scrub, and semi-improved neutral grassland. Of these, the habitat with the lowest LCL is broad-leaved deciduous woodland, with an LCL of 10 kg N/ha/yr. The increase in N deposition is 24.5% of this LCL. The area affected is 11% of the site and the duration of change is for 4 years of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county or metropolitan value could be either neutral or slight. Given the precautionary approach adopted throughout, the effect is assessed as neutral (not significant).

5.14 Low Well Wood (AW_Theme_ID 1505468) AW

Baseline

Table 5.23 Low Well Wood (AW_Theme_ID 1505468) AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	15_AW_CON
Resource importance:	National
Overlapping site:	Low Well Wood, South Ockendon LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.92
Site description - desk study:	This area of ancient woodland coincides with the northern part of the Low Well Wood, South Ockendon LWS. The LWS description (undated) refers to both the north and southern sections as AW even though only the northern area is listed on the Ancient Woodland Inventory. The LWS provides the following description: 'This ancient woodland is bisected by the A13, providing a significant barrier to migration, and effectively creating two ecologically separate woods. Sycamore (*Acer pseudoplatanus*) is abundant amongst a native canopy of ash (*Fraxinus excelsior*), pedunculate oak (*Quercus robur*) and long-ago planted sweet chestnut (*Castanea sativa*). A rather impoverished ground flora includes locally frequent creeping soft-grass (*Holcus mollis*), Lesser celandine (*Ranunculus ficaria*) and bluebell (*Hyacinthoides non-scripta*), along with wood spurge (*Euphorbia amygdaloides*), wood meadow-grass (*Poa nemoralis*), primrose (*Primula vulgaris*) and red campion (*Silene dioica*). The flora of the southern section is rather better, with less sycamore. Along the northern edge of the northern section is an interesting strip of short perennial/developing acid grassland. This flower-rich sward includes much black medick (*Medicago lupulina*), common stork's-bill (*Erodium cicutarium*), dove's-foot crane's-bill (*Geranium molle*), marsh cudweed (*Gnaphalium uliginosum*), early forget-me-not (*Myosotis ramosissima*) and wall speedwell (*Veronica arvensis*). As a small grassy glade of some value to invertebrates, this small patch would be worthy of retention, with some local coppicing of the wood to the south to improve light levels.'

Site condition - As described in citation/by site manager:	Low Well Wood LWS description includes the following: Restoration of the original semi-natural canopy at the expense of the dominant sycamore would be a major undertaking, but it is one that should be considered. The acid grassland glade should be enhanced.
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.24 Low Well Wood(AW_Theme_ID 1505468) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 52.6 DM: 49.88 DS: 50.34
Construction - Ndep increase (max for site) kg N/ha/yr	0.46
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	4.6
Construction - increase over 0.4 kg N/ha/yr	0.06
Construction - impact extent (ha)	0.18
Construction - impact extent (% of site)	9.55
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant

Compensation proposed	Not required

Assessment Rationale

5.14.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.46 kg N/ha/yr. This area of ancient woodland coincides with the northern part of the Low Well Wood, South Ockendon LWS. The LWS citation refers to broad-leaved deciduous woodland with an impoverished ground flora. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 4.6% of this LCL. Species recorded are mostly indicative of medium and high fertility, with the exception of the northern edge of the site where a strip of short perennial/developing acid grassland is present with indicators of less fertile habitat. The area affected is 10% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.15 Low Well Wood, South Ockendon LWS

Baseline

Table 5.25 Low Well Wood, South Ockendon LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	
Resource importance:	County
Overlapping site:	Low Well Wood(AW_Theme_ID 1505468) AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	4.78
Site description - desk study:	The LWS description (undated) refers to both the north and southern sections as AW, with the following description: 'This ancient woodland is bisected by the A13, providing a significant barrier to migration and effectively creating two ecologically separate woods. Sycamore (*Acer pseudoplatanus*) is abundant amongst a native canopy of ash (*Fraxinus excelsior*), pedunculate oak (*Quercus robur*) and long-ago planted sweet chestnut

	(*Castanea sativa*). A rather impoverished ground flora includes locally frequent creeping soft-grass (*Holcus mollis*), lesser celandine (*Ranunculus ficaria*) and bluebell (*Hyacinthoides non-scripta*), along with wood spurge (*Euphorbia amygdaloides*), wood meadow-grass (*Poa nemoralis*), primrose (*Primula vulgaris*) and red campion (*Silene dioica*). The flora of the southern section is rather better, with less sycamore. Along the northern edge of the northern section is an interesting strip of short perennial/developing acid grassland. This flower-rich sward includes much black medick (*Medicago lupulina*), common stork's-bill (*Erodium cicutarium*), dove's-foot crane's-bill (*Geranium molle*), marsh cudweed (*Gnaphalium uliginosum*), early forget-me-not (*Myosotis ramosissima*) and wall speedwell (*Veronica arvensis*). As a small grassy glade of some value to invertebrates, this small patch would be worthy of retention, with some local coppicing of the wood to the south to improve light levels.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.26 Low Well Wood, South Ockendon LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 52.6 DM: 49.88 DS: 50.34
Construction - Ndep increase (max for site) kg N/ha/yr	0.46
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	4.6

Construction - increase over 0.4 kg N/ha/yr	0.06
Construction - impact extent (ha)	0.18
Construction - impact extent (% of site)	3.84
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	2
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.15.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.46 kg N/ha/yr. The LWS encompasses Low Well Wood AW and the NAA is within that part of the site. The LWS citation refers to broad-leaved deciduous woodland with an impoverished ground flora. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 4.6% of this LCL. Species recorded are mostly indicative of medium and high fertility, with the exception of the northern edge of the site where a strip of short perennial/developing acid grassland is present with indicators of less fertile habitat. The area affected is 3.84% of the site and the duration of change is for 2 years of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county or metropolitan value could be either neutral or slight. Given that the NAA is within nationally important ancient woodland, it is considered precautionary to assess the effect as slight adverse (not significant).

5.16 Mar Dyke LWS

Baseline

Table 5.27 Mar Dyke LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	316_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	86.89
Site description - desk study:	The description for Mar Dyke LWS (updated) is as follows: 'These pastures bordering the Mar Dyke form, in the borough context, a particularly extensive grassland area and an important wildlife corridor. Although floristically unremarkable, such extensive river flood plain grassland systems are rare in Essex. They have a sward typified by cock's-foot (*Dactylis glomerata*), ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*) and various clovers (*Trifolium sp.*). Some areas have localised areas of semi-improved acid grassland, where sheep's sorrel (*Rumex acetosella*) can be found. The Mar Dyke itself has little floating aquatic vegetation but the banks support a marginal flora of purple loosestrife (*Lythrum salicaria*), bur-reed (*Sparganium sp.*), reed (*Phragmites australis*), reed Sweet-grass (*Glyceria maxima*), greater pond-sedge (*Carex riparia*), reed canary-grass (*Phalaris arundinacea*) and reedmace (*Typha latifolia and T. angustifolia*). barn owls are known to frequent the Mar Dyke/Watts's Wood area. Some areas, such as to the north of Watts's Wood have been unmanaged and are becoming rather scrubbed up. Whilst limited scrub is of some wildlife value, the overall integrity of the site would be compromised if too much scrub cover developed. '

Site condition - As described in citation/by site manager:	The Mar Dyke LWS description includes the following management comments: Current management covers the entire spectrum from unmanaged and becoming covered with scrub, right through to over-stocked with grazing horses and being trampled almost bare. A more holistic approach to the distribution and intensity of grazing would be beneficial, so that this beneficial management practice is more evenly distributed along the length of the valley.'
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.28 Mar Dyke LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.63 DM: 42.85 DS: 44.41
Construction - Ndep increase (max for site) kg N/ha/yr	1.57
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	15.7
Construction - increase over 0.4 kg N/ha/yr	1.17
Construction - impact extent (ha)	0.98
Construction - impact extent (% of site)	1.13
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	3
Mitigation proposed	Not required

Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.16.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.57 kg N/ha/yr. The citation and a review of aerial imagery suggests that the site supports broad-leaved deciduous woodland, wetland, scrub, and flood-plain neutral grassland. Of these, the habitat with the lowest LCL is broad-leaved deciduous woodland, with an LCL of 10 kg N/ha/yr. The increase in N deposition is 15.7% of this LCL. The area affected is 1% of the site and the duration of change is for 3 years of the construction phase, so is temporary and reversible. Considering the area affected, the range of habitats and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

5.17 MILL WOOD(AW_Theme_ID 1119931) AW

Baseline

Table 5.29 MILL WOOD(AW_Theme_ID 1119931) AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	91_LWS_AW
Resource importance:	National
Overlapping site:	Thick/Hollow Bottom Shaws LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	9.74

Site description - desk study:	This ancient and semi-natural woodland is list on the Ancient Woodland Inventory and shares its boundary with Thick/ Hollow Shaws LWS (in the area within 200m of the construction ARN). The LWS description relating to this wood is: Thick Shaw to the north of the A127 road has a scattered high canopy of pedunculate oak (*Quercus robur*) standards and ash (*Fraxinus excelsior*) coppice. Wild service-tree (*Sorbus torminalis*) is also recorded from this part of the site. Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*) dominate the shrub layer. Bluebell (*Hyacinthoides non-scripta*) is abundant within the woodland, whilst other ancient woodland indicators recorded include dog's mercury (*Mercurialis perennis*) and wood millet (*Milium effusum*).
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.30 MILL WOOD(AW_Theme_ID 1119931) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 53.03 DM: 49.81 DS: 50.58
Construction - Ndep increase (max for site) kg N/ha/yr	0.77
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	7.7
Construction - increase over 0.4 kg N/ha/yr	0.37
Construction - impact extent (ha)	0.18

Construction - impact extent (% of site)	1.87
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.17.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.77 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland and part of Mill Wood lies in the southernmost part of a wider network of ancient woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 7.7% of this LCL. The area affected is 2% of the site and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Despite the area affected, the increase in N deposition is so short-lived that no effect on key characteristics or integrity is anticipated. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.18 Puddle Dock Angling Centre SINC

Baseline

Table 5.31 Puddle Dock Angling Centre SINC: Baseline

Designation:	SINC
AQ (Construction) model point codes:	522_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No

Side of River Thames:	North
Site area (ha):	12.53
Site description - desk study:	Puddle Dock Angling Centre is a SINC of Borough Grade II importance (first notified 01/03/2002). The site description summary is as follows: 'A variety of wetland habitats, with a population of the rare water vole'. The habitats are listed as hedge, pond/lake, running water, scrub, semi-improved neutral grassland, and wet ditches. The SINC site description is as follows: The grounds of this angling centre contain a good variety of wildlife habitats. About half of the site is neutral grassland. This includes wet areas dominated by tufted hair-grass (*Deschampsia cespitosa*) with abundant hard rush (*Juncus inflexus*), and drier areas either dominated by couch (*Elytrigia repens*) and false oat-grass (*Arrhenatherum elatius*) or with finer species such as crested dog's-tail (*Cynosurus cristatus*), meadow barley (*Hordeum secalinum*) and sweet vernal-grass (*Anthoxanthum odoratum*). There are a limited range of wild flowers including common knapweed (*Centaurea nigra*), common fleabane (*Pulicaria dysenterica*), docks (*Rumex spp.*), creeping buttercup (*Ranunculus repens*) and scattered ruderals. Much of the rest of the site is open water with small quantities of marginal vegetation of common species such as hard and soft rushes (*J. effusus*) and great reedmace (*Typha latifolia*). The abundance of young fish attracts herons and kingfishers. Some of the ditches have a slightly richer flora including celery-leaved buttercup (*Ranunculus sceleratus*), flote-grass (*Glyceria fluitans*) and water mint (*Mentha aquatica*) and are used by water voles. The main drainage feature running south from Warley Street is heavily shaded by blackthorn (*Prunus spinosa*) scrub that is likely to be of value for nesting birds. Agricultural hedges that surround the site include a line of derelict hawthorn (*Crataegus monogyna*) with a few small crab apple (*Malus sylvestris*), field maple (*Acer campestre*) and oak (*Quercus robur*) along the southern boundary. A line of very old oaks with blackthorn below follows Clay Tye Road and is of potential interest for invertebrates and bats. Warley Street drain runs north from the angling centre and has a relatively open course with common water, starwort (*Callitriche stagnalis*) and curled pondweed (*Potamogeton crispus*), and scattered clumps of great reedmace. There are broad margins of coarse grassland with areas of scrub and tall herbs. This area may support water voles.'
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.32 Puddle Dock Angling Centre SINC: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 27.88 DM: 26.55 DS: 27.19
Construction - Ndep increase (max for site) kg N/ha/yr	0.65
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	3.25
Construction - increase over 0.4 kg N/ha/yr	0.25
Construction - impact extent (ha)	0.25
Construction - impact extent (% of site)	1.96
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.18.1 No survey was undertaken in 2022 as access was not granted. The citation refers to wetlands, hedgerow, scrub, semi-improved neutral grassland, and wet ditches. The increase in N deposition (DS-DM) is 0.65 kg N/ha/yr. A review of aerial

imagery suggests that the NAA supports neutral grassland. The LCL for this habitat is 20 kg N/ha/yr and the increase in N deposition is 3.3% of this LCL. The area affected is 2% of the site and the duration of change is for 1 years of the construction phase, so is temporary and reversible. It is of note that the DS N deposition is within the CL range for this habitat. The grassland species listed in the citation are largely typical of rank, mesotrophic grasslands and there is little to indicate sensitivity to nitrogen. Given the very short-lived increase in N deposition within the CL range, no observable change in vegetation composition or impact on site integrity is predicted. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

5.19 ROUND SHAW(AW_Theme_ID 1119930) AW

Baseline

Table 5.33 ROUND SHAW(AW_Theme_ID 1119930) AW: Baseline

Designation:	AW
AQ (Construction) model point codes:	85_LWS_AW
Resource importance:	National
Overlapping site:	Straight Path Shaw LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.27

Site description - desk study:	The air quality modelling point lies within Roundshaw AW. The norther section of this AW is included within Straight Path Shaw LWS (selected 1992), whose description is as follows: Straight Path Shaw is a narrow streamside ancient wood. The southern part has only a scattered high canopy principally of pedunculate oak (*Quercus robur*) standards. Field maple (*Acer campestre*) and ash (*Fraxinus excelsior*) are found at sub-canopy level whilst hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) form an extensive shrub layer. In contrast, the northern section has ash coppice and pedunculate oak standards forming a high and more shading canopy, with field Maple at sub-canopy level. Ancient woodland species include bluebell (*Hyacinthoides non-scripta*), wood anemone (*Anemone nemorosa*), yellow archangel (*Lamiastrum galeobdolon*), dog's mercury (*Mercurialis perennis*), wood millet (*Milium effusum*), moschatel (*Adoxa moschatellina*) and three-nerved sandwort (*Moehringia trinervia*), with pendulous sedge (*Carex pendula*) along the stream margins. BAP Habitats Lowland mixed deciduous woodland selection criteria HC1 – ancient woodland sites rationale. The structure and flora of this woodland belt suggests that it is an ancient feature.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.34 ROUND SHAW(AW_Theme_ID 1119930) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 46.12 DM: 43.92 DS: 44.83
Construction - Ndep increase (max for site) kg N/ha/yr	0.91

Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	9.1
Construction - increase over 0.4 kg N/ha/yr	0.51
Construction - impact extent (ha)	0.09
Construction - impact extent (% of site)	3.81
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.19.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.91 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broad-leaved deciduous woodland. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 9.1% of this LCL. The area affected is 4% of the site and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

5.20 Straight Path Shaw LWS

Baseline

Table 5.35 Straight Path Shaw LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	85_LWS_AW, 91_LWS_AW
Resource importance:	County
Overlapping site:	ROUND SHAW(AW_Theme_ID 1119930) AW, AW_Theme_ID1420010 AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.55
Site description - desk study:	Straight Path Shaw is a narrow streamside ancient wood. The southern part has only a scattered high canopy principally of pedunculate oak (*Quercus robur*) standards. Field maple (*Acer campestre*) and ash (*Fraxinus excelsior*) are found at sub-canopy level whilst hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) form an extensive shrub layer. In contrast, the northern section has ash coppice and pedunculate oak standards forming a high and more shading canopy, with field maple at sub-canopy level. Ancient woodland species include bluebell (*Hyacinthoides non-scripta*), wood anemone (*Anemone nemorosa*), yellow archangel (*Lamiastrum galeobdolon*), dog's mercury (*Mercurialis perennis*), wood millet (*Milium effusum*), Moschatel (*Adoxa moschatellina*) and three-nerved sandwort (*Moehringia trinervia*), with pendulous sedge (*Carex pendula*) along the stream margins. BAP habitats lowland mixed deciduous woodland selection criteria HC1 – ancient woodland sites rationale. The structure and flora of this woodland belt suggests that it is an ancient feature.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.36 Straight Path Shaw LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 53.03 DM: 49.81 DS: 50.58
Construction - Ndep increase (max for site) kg N/ha/yr	0.91
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	9.1
Construction - increase over 0.4 kg N/ha/yr	0.51
Construction - impact extent (ha)	0.22
Construction - impact extent (% of site)	14.04
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.20.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.91 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broad-leaved deciduous woodland. The LCL for this habitat is

10 kg N/ha/yr and the increase in N deposition is 9.1% of this LCL. The area affected is 14% of the site and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

5.21 Thick_Hollow Bottom Shaws LWS

Baseline

Table 5.37 Thick_Hollow Bottom Shaws LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	85_LWS_AW, 91_LWS_AW
Resource importance:	County
Overlapping site:	MILL WOOD(AW_Theme_ID 1119931) AW AW_Theme_ID1420009 AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.93

Site description - desk study:	The description for Thick/Hollow Bottom Shaws LWS (updated Oct 2012) is as follows: Thick Shaw to the north of the A127 road has a scattered high canopy of pedunculate oak (*Quercus robur*) standards and ash (*Fraxinus excelsior*) coppice. wild service-tree (*Sorbus torminalis*) is also recorded from this part of the site. Hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) dominate the shrub layer. Bluebell (*Hyacinthoides non-scripta*) is abundant within the woodland, whilst other ancient woodland indicators recorded include dog's mercury (*Mercurialis perennis*) and wood millet (*Milium effusum*). Hollow Bottom Shaw, south of the A127, also has scattered pedunculate oak and ash, with bramble (*Rubus fruticosus agg.*) covering extensive areas below, whilst greater stitchwort (*Stellaria holostea*) is prominent in grassy glade areas found within surrounding scrub. The LWS boundary is coincident with two ancient woodland blocks on the Ancient Woodland Inventory; MILL WOOD(AW_Theme_ID 1119931) AW north of the A127 and AW_Theme_ID1420009 AW south of the A127.
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.38 Thick_Hollow Bottom Shaws LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 53.03 DM: 49.81 DS: 50.58
Construction - Ndep increase (max for site) kg N/ha/yr	0.91

Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	9.1
Construction - increase over 0.4 kg N/ha/yr	0.51
Construction - impact extent (ha)	0.28
Construction - impact extent (% of site)	14.26
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.21.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.91 kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broad-leaved deciduous woodland. The LCL for this habitat is 10 kg N/ha/yr and the increase in N deposition is 9.1% of this LCL. The area affected is 14% of the site and the duration of change is for 1 year of the construction phase, so is temporary and reversible. Considering the area affected and the short-lived impact, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

5.22 Tilbury Marshes LWS

Baseline

Table 5.39 Tilbury Marshes LWS: Baseline

Designation:	LWS
AQ (Construction) model point codes:	22_LWS_CON
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	39.83

Site description - desk study:	The description for Tilbury Marshes LWS (undated) is as follows: 'This Site comprises relict grazing-marsh, brackish ditches and the outer moats and grasslands of Tilbury Fort. The moats are prone to inundation with brackish water and, because of problems with the sluice controls are currently rather dry. These moats should be examined for invertebrates associated with saline lagoons, an Essex habitat BAP. This has had the benefit of allowing a diverse saltmarsh flora to develop, with species such as saltmarsh rush (*Juncus gerardii*), glassworts (*Salicornia spp.*), sea aster (*Aster tripolium*), annual seablite (*Suaeda maritima*) and the nationally scarce stiff saltmarsh-grass (*Puccinellia rupestris*) and sea barley (*Hordeum marinum*). The grazing land supports a good grazing-marsh flora, with many Nationally Scarce plants such as divided sedge (*Carex divisa*), sea barley, slender hare's-ear (*Bupleurum tenuissimum*) grassland, with some hairy buttercup (*Ranunculus sardous*), lady's bedstraw (*Galium verum*), narrow-leaved bird's-foot trefoil (*Lotus glabertenuis*), Hard-grasses (*Parapholis sp.*) and sea-spurreys (*Spergularia spp.*). The north-western section lies adjacent to the now-lost "Ferry Fields" grassland, an important invertebrate habitat destroyed by development, but some of the key species may survive on these remaining fragments of grassland. Such grassland have developed under a historical regime of grazing livestock. This is evident today, but in the form of uncontrolled horse pasturing by local people. Such grazing is vital and should be continued, if better controlled. Although an important part of the historical landscape, flooding the moats would harm the developing saltmarsh vegetation.'
Site condition - As described in citation/by site manager:	Unknown
Pressures and threats - As described in citation:	Unknown

Assessment

Table 5.40 Tilbury Marshes LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20

Construction - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 17.07 DM: 21.06 DS: 21.47
Construction - Ndep increase (max for site) kg N/ha/yr	0.4
Construction - Increase as % LCL (based on min LCL for AQ pts associated with site)	2.0
Construction - increase over 0.4 kg N/ha/yr	0.0
Construction - impact extent (ha)	1.6
Construction - impact extent (% of site)	4.02
Construction - impact duration (number of years where Ndep increase exceeds 0.4 kg N/ha/yr)	1
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

5.22.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.4kg N/ha/yr. The modelling was undertaken using an assumption that the most sensitive habitat present was neutral grassland with a LCL of 20kg N/ha/yr. The increase in N deposition is 2% of this LCL. The LWS is designated for relict grazing-marsh, brackish ditches, including the Tilbury Fort outer moats, and grasslands. The APIS website (CEH, 2022) provides a CL range for coastal and floodplain grazing marsh and for salt marsh of 20-30kg N/ha/yr but acknowledges the lack of experimental studies into N deposition effects on these habitats. However, N deposition is likely to be less important than nutrient enrichment via fertiliser wash off into drainage channels and nutrient loadings from tidal inputs. Aerial imagery indicates that the NAA overlaps the grassland habitats adjacent to Fort Road. The area affected is 4% of the site and the

duration of change is for 1 year of the construction phase, so is temporary and reversible. Considering that the DS N deposition is within the CL range for this habitat, the small area affected, that rough grassland is typically mesotrophic and not particularly sensitive to nitrogen, it is unlikely that the predicted increase in N deposition would cause an observable change in vegetation composition. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6 Baselines and impact assessments of sites screened in for operation

6.1 Introduction

6.1.1 The sites assessed are shown on Figure 2 of this report. The figure also shows the extents of areas within each site where N deposition is predicted to exceed the threshold for theoretical loss of one species used in the assessment (i.e. 0.4kg N/ha/yr). Assessments of effects on individual sites during operation are presented in tables below.

6.1.2 Additional detailed information is provided in Annexes as follows:

a. Species composition lists and Ellenberg values

b. Habitat Condition Data

c. Photographs

6.2 M2 Junction 3-4 Mitigation

6.2.1 The following sites were initially screened in for assessment but have been screened out following application of the M2 mitigation, as set out in the Project Air Quality Action Plan (Appendix 5.6 Application document 6.3). Therefore, these sites have not been subject to detailed assessment.

a. AW_Theme_ID_1498717 (OBJECT ID 11749) AW

b. AW_Theme_ID_1501634 (OBJECT ID 12881) AW

c. Middlefield Shaw AW (AW_Theme_ID_1501447,1500825,1500821)

d. Westfield Wood (AW_Theme_ID_150470) AW

6.2.2 The proposed mitigation is predicted to reduce the change in N deposition (DS-DM) at the following sites. These sites are assessed using post-mitigation N deposition predictions and the assessment rationale considers the reduction as a result of the mitigation:

a. AW_Theme_ID_1498718 AW

b. Frith Woods Etc., Kits Coty LWS

c. Frith/Impton Woods AW

d. Impton/Podkin Wood AW

6.3 Veteran trees

6.3.1 The physical characteristics of a veteran trees such as age, size, structure and presence of dead and decaying wood are not likely to be affected by increased N deposition. Even a permanent (15 or more years) increase in N deposition is not anticipated to alter the key characteristics of the trees. In line with paragraph

2.7.8 above, a temporary and reversible impact of <15yr is considered to result in a negligible impact level, and a permanent change in N deposition results in a minor adverse impact level. Given that there is not likely to be a change in the key characteristics of the trees, the significance of effect for all trees has been assessed as slight adverse and not significant, as shown in Table 6.1 below.

Table 6.1 Assessment of veteran trees outside designations

Veteran Tree	Ndep kg N/ha/yr Base/DM/DS	Magnitude of impact (DS-DM) kg N/ha/yr	Estimated Impact Duration (years)	Impact Level	Significance
23_VT	Base: 34.39 DM: 33.56 DS: 34.12	0.56	>15	Minor adverse	Slight
27_VT	Base: 32.69 DM: 31.03 DS: 31.66	0.63	<1	Negligible	Slight
401_VT	Base: 33.18 DM: 32.08 DS: 32.64	0.56	10	Negligible	Slight
403_VT	Base: 54.65 DM: 48.23 DS: 50.24	2.02	9	Negligible	Slight
410_VT	Base: 34.08 DM: 32.02 DS: 32.8	0.78	>15	Minor adverse	Slight
424_VT	Base: 37.27 DM: 35.57 DS: 36.08	0.51	12	Negligible	Slight
426_VT	Base: 33.52 DM: 33.16 DS: 33.79	0.63	>15	Minor adverse	Slight
438_VT	Base: 37.75 DM: 36.45 DS: 37.59	1.13	15	Minor adverse	Slight
643_VT	Base: 43.16 DM: 39.61 DS: 40.64	1.03	9	Negligible	Slight
649_VT	Base: 42.28 DM: 38.98 DS: 39.92	0.94	9	Negligible	Slight
652_VT	Base: 42.88 DM: 39.42 DS: 40.41	0.99	9	Negligible	Slight
667_VT	Base: 30 DM: 29.44 DS: 30.07	0.63	1	Negligible	Slight

Veteran Tree	Ndep kg N/ha/yr Base/DM/DS	Magnitude of impact (DS-DM) kg N/ha/yr	Estimated Impact Duration (years)	Impact Level	Significance
668_VT	Base: 30.01 DM: 29.46 DS: 30.08	0.62	6	Negligible	Slight
669_VT	Base: 30.06 DM: 29.51 DS: 30.12	0.61	6	Negligible	Slight
670_VT	Base: 30.17 DM: 29.59 DS: 30.19	0.60	1	Negligible	Slight
671_VT	Base: 30.24 DM: 29.64 DS: 30.25	0.61	1	Negligible	Slight
744_VT	Base: 37.37 DM: 35.79 DS: 36.33	0.54	>15	Minor adverse	Slight
745_VT	Base: 37.32 DM: 35.74 DS: 36.28	0.53	>15	Minor adverse	Slight
752_VT	Base: 37.41 DM: 35.43 DS: 36.01	0.58	>15	Minor adverse	Slight

6.4 All Saints Grassland LWS

Baseline

Table 6.2 All Saints Grassland LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	10_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.75
Site Description - desk study:	All Saints Churchyard, Vange (BA34), location NGR: TQ 715867, post code SS16 4TP. The most recent description (2009) states that there was a boundary change to this site in 2008 which removed most of the churchyard and added the adjacent paddock. The description states that the grassland includes some horse grazed paddocks and a small part of the yard of a now redundant church yard. The widespread species include yarrow, common bent, black knapweed, false oat-grass, crested dog's-tail, meadow barley, autumn hawkbit, meadow vetchling, lady's bedstraw, bird's-foot trefoil, agrimony, yellow oat-grass and ox-eye daisy. The description records the grassland as National Vegetation Classification (NVC) MG5 and a UK BAP Priority Habitat (lowland meadow). The LWS is not listed on MAGIC as under an agri-environment scheme or shown as a priority habitat.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	28/04/2022

Field survey habitat parcel descriptions:	Habitat parcel 1. This is a largely unmanaged hawthorn dominated hedge, with abundant wild privet and blackthorn, the latter encroaching into the adjacent field. Ash is frequent as a sapling and abundant as a standard towards the eastern end where there are about six standards. The ground layer is dominated by ivy. The hedgerow has no gaps but is leggy due to lack of management of the woody species. Habitat parcel 2: Rank grassland supporting frequent smooth meadow-grass, false oat-grass, cocks-foot, Yorkshire fog, perennial rye-grass and meadow barley. Crested dog's-tail, black knapweed and wild carrot were occasional and ragwort was rare. Perennial rye-grass was scarce, but dominant around the gate at the western end of the Habitat parcel. Blackthorn is encroaching into the meadow from the adjacent hedge. The meadow requires appropriate management to restore it to MG5 (crested dog's-tail -common knapweed grassland).
Lichens:	No lichens
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1: the hedgerow is strimmed along its road-facing side. Habitat parcel 2: Former horse paddock but now appears to have been unmanaged for several years. It is now rank and dominated by false oat-grass.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: lay hedge to reduce its legginess; Habitat parcel 2: Grazing and/or mowing for to reduce rank species and increase forbs.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1 (hedgerow). Lack of hedgerow management for nature conservation purposes. Habitat parcel 2 (grassland): lack of grassland management
Ellenberg values:	Habitat parcel 1: min 5, max, and mean 6.47; Habitat parcel 2: min 3, max 8, mean 5.14
Ellenberg value score 4 and below:	Habitat parcel 1 (hedgerow): no species with EV4 or below; Habitat parcel 2 (grassland): species with EV4: yarrow, common bent, common mouse-ear, crested dog's-tail, ox-eye daisy, primrose, fleabane, meadow buttercup, common sorrel, common ragwort, lesser stitchwort yellow oat-grass; species with EV3: sweet vernal-grass,
Habitat type (UKHab category):	Habitat parcel 1: h2a - Hedgerow (priority habitat) Habitat parcel 2: g3c5 - Arrhenatherum neutral grassland

Habitat condition - area affected by Ndep:	Habitat parcel 1 (hedgerow): good Habitat parcel 2 (grassland): moderate
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Due to the narrow width of the NAA, Habitat parcels 1 and 2 are considered together. Survey recorded species with every EV between 3 and 8 inclusive. One Ancient Woodland Indicator (AWI), primrose was recorded. Primrose is a nitrophobe with EV4, indicating sensitivity to nitrogen. Within the grassland Habitat parcel common bent (EV 4) was frequent sweet vernal grass (EV3) was occasional. Nitrophiles recorded were: abundant ivy, EV6; frequent bramble, EV6 and is known to respond to increased nitrogen and rare false oat-grass, EV7. Common nettle, EV8, a nitrophile and indicator of nutrient enrichment, was occasional.

Assessment

Table 6.3 All Saints Grassland LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 35.89 DM: 34.08 DS: 34.51

Operation - Ndep increase (max for site) kg N/ha/yr	0.43
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	2.15
Operation - increase over 0.4 kg N/ha/yr	0.03
Operation - impact extent (ha)	0.1
Operation - impact extent (% of site)	5.9
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.4.1 The DM and DS N deposition both exceed the critical load range for neutral grassland of 20-30kg N/ha/yr. The maximum increase in N deposition (DS-DM) is 0.43kg N/ha/yr and 2.1% of the LCL. The area affected is a strip of a maximum 10m width along the northern boundary of the site. The total NAA is 0.1ha (5.9% of the site). The NAA comprises hedgerow in good condition and grassland in moderate condition. The grassland supports some nitrogen-sensitive species with EV of 4, including yarrow, common mouse-ear, ox-eye daisy, primrose, common sorrel and lesser stitchwort. Sweet vernal-grass (EV 3) was also recorded. However, the nitrogen sensitive species lady's bedstraw and bird's foot-trefoil (both EV 2), which are listed in the citation, were not recorded in the survey of the NAA. Species more typical of higher nutrient levels, such as false oat-grass (EV 7), ivy (EV6), bramble (EV6) and common nettle (EV 8) were present in the vegetation and could increase in abundance in response to increased nitrogen deposition. The CL range for neutral grassland is 20-30kg N/ha/yr and this is for low and medium altitude hay meadows, which are characteristically lower in nutrients than the type of grassland at this site. It is possible that an increase in N deposition could enable the more competitive rank grassland species to further expand at the expense of the more sensitive forb species. However, this is

such a small proportion of the site (the 5.9% estimate also includes the hedgerow), that there is unlikely to be an effect on the key characteristics of the site or overall site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as negligible adverse, resulting in a neutral effect (not significant).

6.5 ANDREWS WOOD (AW_Theme_ID 1499246) AW

Baseline

Table 6.4 ANDREWS WOOD (AW_Theme_ID 1499246) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	121_AW_LWS
Resource importance:	National
Overlapping site:	Woodlands West of Shoreham LWS
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	11.88
Site Description - desk study:	A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. This AW is within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.5 ANDREWS WOOD (AW_Theme_ID 1499246) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.82 DM: 48.27 DS: 48.83
Operation - Ndep increase (max for site) kg N/ha/yr	0.56
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.56
Operation - increase over 0.4 kg N/ha/yr	0.16
Operation - impact extent (ha)	1.19
Operation - impact extent (% of site)	9.99
Operation - impact duration (years until emissions DS = DM at opening yr)	2
Mitigation proposed	No feasible mitigation available, see Project Air Quality Action Plan (PAQAP) Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.5.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.56kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 5.6% of this LCL. This AW is part of a larger area within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS. However, the apparent density of the canopy cover within the NAA may limit the growth of ground flora species. The area affected is 10% of the AW and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 2 years, so is assessed as a temporary and theoretically reversible. Considering the area affected, time to reduce to DM levels and the precautionary approach applied in the absence of site survey data, it is considered possible that an increase in N

deposition has the potential to affect the integrity of the site.
Therefore, the impact level has been assessed as moderate adverse and it is considered reasonable to assess the effect as moderate adverse (significant).

6.6 AW_Theme_ID_1486679 (Object ID 9096) AW

Baseline

Table 6.6 AW_Theme_ID_1486679 (Object ID 9096) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	238_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.33
Site Description - desk study:	The site is designated AW and lies to the west of the M2, south-east of junction 1. The site is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland' and Priority Habitat Inventory classifies it as deciduous woodland (with low confidence). No citations or descriptions available.
Site Condition - As described in citation/by site manager:	None known
Dates surveyed (2021 and 2022):	06/08/2021 and 05/05/2022
Field survey habitat parcel descriptions:	Ancient coppice woodland dominated by sweet chestnut, with an abundance of AWIs. Eastern half of woodland conforms with NVC community W10 in terms of the ground layer, while the western half resembles W8. Appears more acidic in the eastern part of the wood than further west, with a less diverse ground flora dominated by bluebell.
Lichens:	No suitable oak or ash trees for lichens.

Vegetation gradient:	No vegetation gradient. Only transition is from W10 woodland in the east of the site to W8 in the west.
Notes on active management (field survey observations):	No active management. Old coppiced sweet chestnut but no sign of recent management.
Notes on required or beneficial management (field survey observations):	Some coppicing to increase structural diversity
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey observed some woodland damage due to fly-tipping.
Ellenberg values:	Min 3; max 9; and mean 5.96
Ellenberg value score 4 and below:	Moschatel 5, silver birch 4, wild strawberry 4, creeping soft-grass 3, pedunculate oak 4, common dog violet 4
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (28 points)
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Creeping soft-grass (AWI and EV3) has the lowest EV of the species recorded but is noted as a nitrophile, likely to increase in response to increased N (Pitcairn et al. 2006). Bramble and bluebell are the most abundant species in the field layer, both of which have EV of 6 and are known to respond to increased N. Dog's-mercury, which is frequent in the ground layer is also a nitrophile (EV 7). Nettle and cleavers (EV 8) are both present but at low frequency.

Assessment

Table 6.7 AW_Theme_ID_1486679 (Object ID 9096) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.31 DM: 41.96 DS: 44.02
Operation - Ndep increase (max for site) kg N/ha/yr	2.06
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	20.6
Operation - increase over 0.4 kg N/ha/yr	1.66
Operation - impact extent (ha)	0.89
Operation - impact extent (% of site)	66.66
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse

Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.6.1 The DS N deposition is more than double the upper critical load of 20kg N/ha/yr at 44.31kg N/ha/yr. The increase in N deposition (DS-DM) is more than 20% of the LCL. The site investigation did not record any gradient in the vegetation in relation to distance from the existing M2. Creeping soft-grass (AWI and EV3) has the lowest EV of the species listed but is a nitrophile, likely to increase in response to increased N (Pitcairn et al. 2006). Bramble and bluebell, both of which have EV of 6 and are known to respond to increased N are abundant in the field layer. Dog's-mercury (EV7) is also a nitrophile and is frequent in the ground layer. Other species which could increase in response to increased nitrogen are common nettle and cleavers (EV 8), which are both present but at low frequency. The species composition at the site could change in terms of the relative proportions of species, with possible increases in bramble, common nettle and cleavers, but it is of note that the typical woodland ground flora species recorded at this site, such as creeping soft-grass, bluebell and dog's-mercury are nitrophiles and could also increase in response to increased nitrogen. Therefore these typical species are not predicted to be lost as a direct result of increased N deposition. However, a rapid increase in the more vigorous species bramble, common nettle and cleavers could reduce the abundance of these smaller, less competitive species.

Although it is unlikely that there will be a perceptible change in vegetation composition, it is predicted that approximately two thirds of this site will be affected by increased N deposition. Given the lack of scientific data for woodland habitats, a precautionary approach has been taken and it is assumed that there could be an impact on site integrity.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as a permanent impact. Therefore, the impact level has been assessed as major. The effect of a major impact level on a site of national value could be either large or very large adverse. Given the absence of nitrogen sensitive species and the precautions already adopted in the assessment, the resulting effect is assessed as large adverse (significant).

6.7 AW_Theme_ID_1486820 (A2_M2 ROUNDABOUT) AW

Baseline

Table 6.8 AW_Theme_ID_1486820 (A2_M2 ROUNDABOUT) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	235_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	0.6
Site Description - desk study:	The stand of Ancient and Semi Natural Woodland (AW) is enclosed by the M2 and the slip road from the A259. The NAA includes all the AW but does not include the ring of young trees surrounding the AW. No further information about the site is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed due to lack of safe access.
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A

Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.9 AW_Theme_ID_1486820 (A2_M2 ROUNDABOUT) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.51 DM: 42.9 DS: 46.1
Operation - Ndep increase (max for site) kg N/ha/yr	3.21
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	32.08
Operation - increase over 0.4 kg N/ha/yr	2.81
Operation - impact extent (ha)	0.6
Operation - impact extent (% of site)	100.0
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.7.1 The DS N deposition is more than double the upper critical load of 20kg N/ha/yr at 46.1kg N/ha/yr. The increase in N deposition is 3.21kg N/ha/yr, which is 32.1% of the LCL for broadleaved deciduous woodland.
The site is on the A2/M2 roundabout and so could not be safely accessed for detailed site investigation and it is unknown if any nitrogen-sensitive species are present. It is likely that the ground flora of this woodland block is already degraded due to current and historical N deposition, as well as lack of management. Furthermore, the fragmented and isolated nature of the woodland block mean that ecosystem structure and function and thus integrity are likely to be already compromised.

It is predicted that all of this site will be affected by increased N deposition. Given the lack of baseline information, a precautionary approach is taken and it is assumed that there may be an effect on site integrity.
The duration of increase above DM is more than fifteen years, which is considered permanent and irreversible. Therefore, the impact level has been assessed as major. The effect of a major impact level on a site of national value could be either large or very large adverse. Given that this is a small and isolated block of woodland on a roundabout, and due to the precautions already adopted throughout the assessment, the effect is assessed as large adverse (significant).

6.8 AW_Theme_ID_1486860 (Shorne Woods) AW

Baseline

Table 6.10 AW_Theme_ID_1486860 (Shorne Woods) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	233_SSSI_LWS_AW, 680_VT
Resource importance:	National
Overlapping site:	Shorne And Ashenbank Woods SSSI
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	6.44
Site Description - desk study:	This woodland block is entirely within Shorne and Ashenbank Woods SSSI. There is no separate description for AW_ThemeID1486860, but the SSSI citation describes the SSSI as forming a complex of ancient and plantation woodland and including a variety of stand-types associated with Tertiary gravels, clays and sands. The SSSI supports an important and diverse invertebrate fauna, especially beetles, true bugs and dragonflies. The woodland varies from pure sweet chestnut coppice, in places heavily invaded by sycamore, to a more mixed broadleaved community, consisting of mature oak, sweet chestnut, and hornbeam. The notified habitats of the site comprise the National Vegetation Classification woodland types W8 and W10.

Site Condition - As described in citation/by site manager:	Natural England assessed Unit 2, on 15 Oct 2010, as being in favourable condition, although note Unit 2 covers a considerably larger area than ThemeID1486860. NE's comments on Unit 2 are as follows: 'This is a large block of woodland with a mixture of stand types and moderate structural diversity. Much of the wood is made up by sweet chestnut coppice but there are also areas of wet woodland and extensive areas of recently established birch woodland on former clay workings. A fairly rich ground flora is present and there are features present likely to make the area of value for invertebrates. Overall habitat condition is good. The extent of woodland is being maintained. The woodland is largely made up by even-aged sweet chestnut coppice with frequent old standards of oak and sweet chestnut, and there is occasional hornbeam, cherry, elm and yew. Sycamore is occasional but cover is well within target. Some near-veteran trees are present and there is good representation of standing and lying dead wood. There is a relatively small proportion made up by early growth stage woodland but there are several areas of recent coppice. Many of the rides are narrow and shady and would benefit from widening to increase connectivity for invertebrates. The extent of open space is being extended through on-going expansion of the acid grassland area at Randall Heath. Bracken control has been undertaken here and fencing installed to allow cattle grazing. The introduction of grazing is likely to be of benefit to the diversity of the grassland habitat and will provide additional features of value to invertebrates. Parts of the woodland have a shrub layer provided by holly, hazel, birch and hawthorn. Diversity is provided by wet woodland associated with streams where alder, ash, field maple and grey willow are locally prominent. The ground flora is varied in relation to soil type and includes a range of characteristic species including wood sage, yellow pimpernel, bluebell, nettle-leaved bellflower, barren strawberry and woodbine. Wood spurge is frequent in places. There are no indications of deer browsing and no evidence of constraints on tree regeneration.'
Dates surveyed (2021 and 2022):	21/05/2021 and 6/6/2022
Field survey habitat parcel descriptions:	Habitat Description (only Habitat parcel 1): The woodland is a complex mosaic consisting of stands of hornbeam and oak plantation, circa 40 years old, dense stands of birch regeneration circa 5 years old, and mixed woodland of oak, hornbeam and birch. The ground undulates significantly probably from previous mining activities (sand and gravel). The raised areas are typically drier and the lower areas which have not become ponds or lakes are wetter. The clearly planted hornbeam and oak plantation (where quadrat 1 was sampled) is well spaced healthy predominantly hornbeam with oak and a small amount of birch and ash. The field layer is often leaf litter with the dominant species being bluebell. The

	birch stands are a dense self-seeded monoculture of young trees growing to 3 + metres high, with a Diameter at Breast Height (DBH) of 10-15cm. The main path, parallel and close to the road is steeply banked on each side with hornbeam predominating. Here there is significant bare ground with no leaf litter to a width of 20-30 metres.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed.
Notes on active management (field survey observations):	Plantation. Rhododendron management, signage, evidence of deer grazing. The only visible management is path maintenance.
Notes on required or beneficial management (field survey observations):	The areas of erosion close to the road might be controlled by signage, temporary fencing and planting. Invasive rhododendron and laurel should be removed and controlled. Bramble could also be controlled. Shorne Wood Country Park Management Plan 2015-2020 includes a compartment summary providing compartment number, area, tree species and long term management. However, there is no accompanying map showing the location of the compartments. It is unknown whether there is a current management plan.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The AW is well used by members of the public and school groups, so will have associated pressures, including disturbance to wildlife and habitats, littering and dogs. Pressures include erosion, and rhododendron, buddleia and laurel growth with bramble incursion.
Ellenberg values:	Transect 1 (Habitat parcel 1) min 2, max 8, mean 5.47.
Ellenberg value score 4 and below:	Transect 1 (Habitat parcel 1): species with EV4: wood anemone, silver birch, wild strawberry, pedunculate oak and common dog violet; species with EV 3: bracken; species with EV 2: field wood rush.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate 27.
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 AQ modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of AW_ThemeID_1486860 (Shorne Woods) (Habitat parcel 1) recorded species with every EV between 3 and 8 inclusive. One AWI of EV4 was recorded: wood anemone (nitrophobe), and one AWI of EV 2, southern wood-rush. Common dog violet, EV4, a nitrophobe and not an AWI in Kent was occasional in the field layer. Wild strawberry, EV4

	was rare, also not an AWI in Kent. The nitrophile bluebell, EV 6, was abundant in the field layer, this species may respond to increased nitrogen in moist soils Pitcairn et al (2006). The nitrophile bramble, EV 6, was frequent in the field layer, and is known to respond to increased nitrogen. Cleavers and common nettle, EV 8, and indicators of nutrient enrichment was present in the field layer.

Assessment

Table 6.11 AW_Theme_ID_1486860 (Shorne Woods) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 33.51 DM: 32.19 DS: 32.68
Operation - Ndep increase (max for site) kg N/ha/yr	0.49
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.91
Operation - increase over 0.4 kg N/ha/yr	0.09
Operation - impact extent (ha)	6.21
Operation - impact extent (% of site)	96.39

Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.8.1 This small AW block (6.44ha) is entirely within Shorne and Ashenbank Woods SSSI and is therefore assessed as part of that site. This area was surveyed in 2022 and is reported as Habitat parcel 1 in the baseline information for the SSSI. The whole of this AW block is within the NAA and nitrogen sensitive species are at risk of loss. Therefore, there could be an effect on the key characteristics and integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of national value could be either large or very large. Given the precautionary measures adopted throughout the assessment, the resulting effect is assessed as large adverse (significant).

6.9 AW_Theme_ID_1486867 (Head Barn Wood) AW

Baseline

Table 6.12 AW_Theme_ID_1486867 (Head Barn Wood) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	640_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No

Side of River Thames:	South
Site area (ha):	2.73
Site Description - desk study:	This is an ancient semi-natural woodland and is listed on the priority habitat inventory as a deciduous woodland (although confidence in main habitat type is low). Site location TQ71306823, post code ME2 2PY. No further desk study information is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.13 AW_Theme_ID_1486867 (Head Barn Wood) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 36.02 DM: 34.94 DS: 35.76
Operation - Ndep increase (max for site) kg N/ha/yr	0.83
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	8.29
Operation - increase over 0.4 kg N/ha/yr	0.43
Operation - impact extent (ha)	1.43
Operation - impact extent (% of site)	52.4
Operation - impact duration (years until emissions DS = DM at opening yr)	15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse

Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.9.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.83kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 8.3% of this LCL.
AW_Theme_ID_1486867 (Head Barn Wood) AW is separated by the High Speed 1 (HS1) railway from the part of Great Wood that is not designated as part of Cobham Woods SSSI. It is also linked by continuously wooded habitat to Merrals Shaw AW to the south. Therefore, it is reasonable to anticipate that the vegetation composition of these sites would be similar. Site survey of Great Wood and Merrals Shaw identified AWI species that are sensitive to N deposition, including primrose and butcher's broom. These species are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. Both sites also support other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as common nettle are currently infrequent but could increase in cover as a result of increased N deposition.
Given the sensitivity of some of the species likely to be present at Head Barn Wood AW, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition at the site could change.
It is predicted that 52.4% of this site will be affected by increased N deposition. Given the probable presence of sensitive species, there could be an effect on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 15 years, so is assessed as a permanent and irreversible. Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of national value could be either large or very large. Considering the percentage of the site affected, the absence of survey data and the time taken to reduce to DM levels, a precautionary approach has been taken and the effect is assessed as very large adverse (significant).

6.10 AW_Theme_ID_1486883 (Object ID 9151) AW

Baseline

Table 6.14 AW_Theme_ID_1486883 (Object ID 9151) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	236_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.32
Site Description - desk study:	The site comprises a stand of woodland along the south side of the A2 / M2 slip road, to the north of the HS1 railway. The site is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. No further information about the site is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	07/07/22
Field survey habitat parcel descriptions:	This small area is a plantation and a small area of original woodland interspersed with modified grassland. There are some ancient woodland indicators including nettle-leaved bellflower and broadleaved helleborine. The plantation trees are predominantly hawthorn no more than 20 years old. The original woodland is made up mainly of ash with severe dieback and some sweet chestnut. The plantation and original woodland are divided by wooden fence. The grassland is dominated by recently sown perennial rye-grass.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No observable vegetation gradient. Ground flora homogenous.

Notes on active management (field survey observations):	No current management.
Notes on required or beneficial management (field survey observations):	Create more open spaces within woodland.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	min 3, max 8, mean 5.64
Ellenberg value score 4 and below:	Species with EV4: silver birch, broad-leaved helleborine and primrose. Species with EV 3 are tor-grass and ivy-leaved bellflower.
Habitat type (UKHab category):	w1h5: other woodland, mixed, mainly broadleaved.
Habitat condition - area affected by Ndep:	Moderate (score 29)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 3 and 8 inclusive. AWI species with an EV of 4 indicating sensitivity to nitrogen include broad-leaved helleborine and primrose. Primrose is considered by Pitcairn et al (2006) to be a nitrophile. Also present were the AWIs ivy-leaved bellflower EV3 and nettle-leaved bellflower EV6. The nitrophiles ivy and dog's mercury (both EV7), were abundant and frequent respectively. The latter species is known to respond to increased nitrogen. The nitrophiles brambles EV6 and bluebell EV6 were both occasional in the field layer and are known to respond to increased nitrogen (bluebell when in moist soil). Tor grass with EV3, indicating potential sensitivity to nitrogen, was occasional. The species with the highest EV (8) was common nettle, an indicator of nutrient enrichment, which was rare in the field layer.

Assessment

Table 6.15 AW_Theme_ID_1486883 (Object ID 9151) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 36.04 DM: 35.02 DS: 35.87
Operation - Ndep increase (max for site) kg N/ha/yr	0.85
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	8.47
Operation - increase over 0.4 kg N/ha/yr	0.45
Operation - impact extent (ha)	0.32
Operation - impact extent (% of site)	100.0
Operation - impact duration (years until emissions DS = DM at opening yr)	11
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.10.1 The DS N deposition exceeds the upper critical load of 20kg N/ha/yr at 35.87kg N/ha/yr. The increase in N deposition is 0.85kg N/ha/yr, which is 8.5% of the LCL for broadleaved deciduous woodland.
The site is on the A2/M2 slip road, but detailed site investigation did not record any gradient in the vegetation in relation to distance from the existing road.

Primrose and broad-leaved helleborine are AWI species recorded in the NAA that are nitrogen -sensitive and could be at risk of loss due to an increase in N deposition. The species with the lowest EV (3) were tor-grass, which is a grass characteristic of calcareous grasslands and ivy-leaved bellflower, which is an AWI. There are other typical woodland ground flora that could increase in response to increased N deposition, such as ivy, dog's mercury, bluebell and bramble. Common nettle, which is indicative of nutrient enrichment is currently scarce but could increase in cover as a result of increased N deposition. Given the sensitivity of some of the species present at this site, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition at the site could change.
It is predicted that all of this site will be affected by increased N deposition. Given the presence of sensitive species, there could be an effect on site integrity.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 11 years, so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate. The significance of effect of a moderate impact level on a site of national value could be either moderate or large adverse. Given that this is a small and isolated block of woodland on a slip road, and due to the precautions already adopted throughout the assessment, the effect is assessed as moderate adverse (significant).

6.11 AW_Theme_ID_1486891 (Between M2 carriageways) AW

Baseline

Table 6.16 AW_Theme_ID_1486891 (Between M2 carriageways) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	641_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.31
Site Description - desk study:	Listed on the Ancient Woodland Inventory as ancient and semi-natural woodland. However, aerial imagery of the strip of land between the M2 carriageways suggests there are few trees and some scattered scrub.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	No surveys undertaken due to lack of safe access
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.17 AW_Theme_ID_1486891 (Between M2 carriageways) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 81.37 DM: 73.56 DS: 81

Operation - Ndep increase (max for site) kg N/ha/yr	8.23
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	82.35
Operation - increase over 0.4 kg N/ha/yr	7.83
Operation - impact extent (ha)	0.31
Operation - impact extent (% of site)	100.0
Operation - impact duration (years until emissions DS = DM at opening yr)	15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.11.1 The DS N deposition is more than four times the upper critical load of 20kg N/ha/yr at 81kg N/ha/yr. The increase in N deposition is 8.23kg N/ha/yr, which is 82.3% of the LCL for broadleaved deciduous woodland.
The site is located between the M2 carriageways and the boundary overlaps with the road itself, so the actual area of woodland is smaller than 0.31ha (estimated at 0.1ha). The area could not be safely accessed for detailed site investigation, and it is unknown if any nitrogen-sensitive species are present. Aerial imagery suggests that the site no longer supports woodland. Woodland ground flora species may be present, but the site is expected to be degraded due to current and historical N deposition, as well as lack of management. Furthermore, the fragmented and isolated nature of the site mean that ecosystem structure and function and thus integrity are likely to be already compromised.
It is predicted that all of this site will be affected by increased N deposition. Given the lack of baseline information, a precautionary approach is taken and it is assumed that there may be an effect on site integrity.
The duration of increase above DM is fifteen years, which is considered permanent and irreversible.
Therefore, the impact level has been assessed as major. The effect of a major impact level on a site of national value

could be either large or very large. Given that this is a very small and isolated site between motorway carriageways, and due to the precautions already adopted throughout the assessment, the effect is assessed as large adverse (significant).

6.12 AW_Theme_ID_1486937 (Longhoes) AW

Baseline

Table 6.18 AW_Theme_ID_1486937 (Longhoes) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	249_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	4.72
Site Description - desk study:	Longhoes AW (ThemeID 1486937) lies within Ranscombe Farm Reserve, which also includes Cobham Woods, Merrals Shaw, Head Barn Wood and Great Wood. It is managed by Plant Life International, in partnership with Medway Council. The Ranscombe Farm Summary Management Plan 2018-2023 (2019) does not specifically mention Longhoes Wood, although it does state that coppicing will be continued within the areas of sweet chestnut coppice and mixed broadleaved coppice.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	13/10/2021 and 17-18/05/2022
Field survey habitat parcel descriptions:	T2: This is a deciduous woodland with an even mixture of ash and sweet chestnut in the canopy layer with occasional oak standards. The shrub layer included frequent hazel, with occasional wild privet and elder. The ground layer was dominated by dog's mercury but included a variety of AWIs for the south-east such as bluebell, primrose and spurge laurel. Wood spurge was occasional, while early purple orchid, yellow archangel and butcher's

	broom were rare. An area near the centre of the parcel had been cleared and a glade opened up for a forest school; this has created a good variety of structure within the woodland and this kind of management, if performed in cycles, would probably benefit the woodland as a whole.
Lichens:	No lichens on suitable trees.
Vegetation gradient:	T1: No visible vegetation gradient. Indicators of nutrient enrichment were scarce throughout.
Notes on active management (field survey observations):	T1: No signs of recent management but mature hazel coppice present. The canopy was very sparse and the ground flora showed no signs of nutrient enrichment. There was educational activity on site with a significant clearing of around 100 m² where fires are made and schools do cooking and woodland activities. It is not known whether this is a permanent clearing or whether it will be moved to another location and the field layer allowed to regenerate. An old wooden 'children's den' construction was noted, with associated trampling of ground flora and soil compaction. A painted mark on an oak tree indicated proposed management. A large cleared area (15x15m), with stumps used for informal seating around a large fire pit and the ground heavily trampled. A basket of very old pots is situated on the edge of the clearing. Appears to be very damaging management. Other cleared areas also present.
Notes on required or beneficial management (field survey observations):	Recommended management includes: 1) Rotation of the woodland activity open-space which could effectively be a coppice rotation; 2) Gradually removing the sweet chestnut to encourage native species in the long-term; 3) Continue of maintaining the site with few paths to prevent it from becoming a dog walking area; 4) Stop damaging activities; 5) Canopy very sparse with regeneration possibly inhibited by deer; 6) Tree planting and shrub planting; 7) deer control; 8) Removal of fire pit; 9) creation of habitat piles from cut wood.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The summary management plan for Ranscombe Farm Reserve (Plantlife, 2019) has sections on visitor numbers, visitor facilities, control of invasive species, cleanliness, litter and dog fouling. This survey noted no signs or recent coppicing, dense canopy with little light reaching the ground, and abundant bramble.
Ellenberg values:	min: 4; max 8; mean 5.77
Ellenberg value score 4 and below:	Wild strawberry 4; early-purple orchid 4, primrose 4, pedunculate oak 4, sessile oak 4, butcher's broom 4, whitebeam 4, Viola sp 4.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	T1: moderate

Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 AQ modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of Longhoes AW recorded a mixture of species of high and low EVs. AWI species with an EV of 4 indicating potential sensitivity to nitrogen include early-purple orchid, primrose, butcher's-broom and a species of violet. Dog's mercury (EV 7), bluebell (EV 6), brambles (EV 6), cow parsley (EV 7) and rough meadow-grass (EV 6) are the most frequent species in the field layer. These species are identified as nitrophiles in Pitcairn et al (2006) and are known to respond to increased N. No gradient was evident, with species indicative of nutrient enrichment (e.g. common nettle and cleavers (both EV 8) scarce throughout. Abundant nitrophiles included bluebell (which may respond to increased nitrogen in wet soils) and bramble (known to respond to increased nitrogen). The nitrophiles rough meadow-grass (EV 6), known to respond to increased nitrogen, was occasional, as was wood avens.

Assessment

Table 6.19 AW_Theme_ID_1486937 (Longhoes) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.65 DM: 48.13 DS: 50.2

Operation - Ndep increase (max for site) kg N/ha/yr	2.06
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	20.63
Operation - increase over 0.4 kg N/ha/yr	1.66
Operation - impact extent (ha)	0.98
Operation - impact extent (% of site)	20.76
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.12.1 The DS N deposition is more than double the upper critical load of 20kg N/ha/yr at 50.2kg N/ha/yr. The increase in N deposition is 2.06kg N/ha/yr, which is 20.6% of the LCL for broadleaved deciduous woodland.

The site investigation did not record any existing gradient in the vegetation. There are AWI species present in the NAA that could be at risk of loss due to an increase in N deposition, such as early-purple orchid, primrose and butcher's-broom. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as common nettle and cleavers are currently scarce but could increase in cover as a result of increased N deposition. Given the sensitivity of some of the species present at this site, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition at the site could change.

It is predicted that approximately 20% of this site will be affected by increased N deposition. Given the presence of sensitive species, there could be an effect on site integrity.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate. The effect of a moderate impact

level on a site of national value could be either moderate or large. Given that nitrogen-sensitive species are persisting in current and historic high levels of N deposition and due to the precautions already adopted throughout the assessment, the effect is assessed as moderate adverse (significant).

6.13 AW_Theme_ID_1498304 AW

Baseline

Table 6.20 AW_Theme_ID_1498304 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	578_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	4.0
Site Description - desk study:	The site lies to the east of the A227 and is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. The AW site lies entirely within Nurstead and Cozendon Woods LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	21/07/2022
Field survey habitat parcel descriptions:	Habitat parcel 1. W8d (ash-field maple—dog's mercury) woodland, ivy sub-community. The canopy is very open adjacent to road with frequent oak but ash is scarce. The understorey is dense and typical of W8 with frequent field maple and wayfaring tree. The ground layer is dominated by ivy and dog's mercury. A total of five AWI were recorded: black bryony, wood melick, field maple, spindle and wayfaring tree. Away from the road, the canopy is closed and ash is much more abundant.
Lichens:	No lichens on suitable trees

Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Tree felling noted adjacent to road, possibly to prevent trees falling into road.
Notes on required or beneficial management (field survey observations):	Where possible allow trees with ash dieback to remain standing to provide dead wood habitat. Selectively clear some of the dominant ivy from the field layer, to allow less competitive woodland ground flora to establish.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Ash dieback.
Ellenberg values:	min 4, max 9, mean 5.79
Ellenberg value score 4 and below:	Pedunculate oak, 4
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Five AWI were recorded, all with EV5 or above, suggesting they do not have sensitivity to nitrogen. No nitrophobes were recorded. Three nitrophiles, which are likely to respond to increased nitrogen were recorded: dominant ivy (EV6), abundant dog's mercury (EV7) and occasional bramble (EV6). No vegetation gradient was observed. No species of EV8 were recorded (i.e. no common nettle or cleavers), although greater burdock, EV9, a species indicative of nutrient enrichment, was present (but rare) in the transect.

Assessment

Table 6.21 AW_Theme_ID_1498304 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.64 DM: 36.95 DS: 37.45
Operation - Ndep increase (max for site) kg N/ha/yr	0.5
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.0
Operation - increase over 0.4 kg N/ha/yr	0.1
Operation - impact extent (ha)	0.11
Operation - impact extent (% of site)	2.82
Operation - impact duration (years until emissions DS = DM at opening yr)	5
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.13.1 The increase in N deposition (DS-DM) is 0.50kg N/ha/yr which is 5% of the LCL for broadleaved deciduous woodland. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. Ash dieback

and Invasive Non-Native Species (INNS) Japanese knotweed was noted to be present on the site.
No AWI indicator species with EV values of 3 or 4 or nitrophobic species were recorded. Nitrophilic species were recorded including abundant dog's mercury (EV7) and occasional bramble (EV6), both of which are known to respond to increased nitrogen Pitcairn et al (2006).
The absence of sensitive species and presence of nitrophiles suggests there is unlikely to be a significant change in vegetation composition due to an increase in N deposition. Considering the species composition and area affected (2.8%) there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 5 years, so is assessed as a temporary and theoretically reversible.
Therefore, the impact level has been assessed as negligible, which results in a slight adverse effect (not significant).

6.14 AW_Theme_ID_1498718 AW

Baseline

Table 6.22 AW_Theme_ID_1498718 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	252_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.29
Site Description - desk study:	The AW lies to the west of the A229 and south of the M2, north-west of junction 2. It is shown on Ordnance Survey mapping as 'Shall Hook Wood'. No further information is available from the desk study.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	17/05/21 and 23/06/22

Field survey habitat parcel descriptions:	This site has abundant sweet chestnut coppice with occasional old beech trees and mature ash and oak. The understorey comprises frequent hornbeam with occasional midland hawthorn and field maple. Species rare in the understorey include yew, dog wood, whitebeam and guelder rose. The field layer is quite rich in AWIs with eight recorded. The most common were bluebell and wood anemone. There was frequent broad buckler fern and one group of yellow bird's-nest was found. This species is listed on Section 41 of the Natural Environment and Rural Communities Act (2006) and listed as 'endangered' on the England Red list.
Lichens:	None observed
Vegetation gradient:	None observed
Notes on active management (field survey observations):	No conservation management evident. Some recent felling of oak and ash noted, considered likely to be for logistical reasons and/or for firewood. Burning of treated wood also present.
Notes on required or beneficial management (field survey observations):	Coppicing of sweet chestnut would be beneficial, litter removal, erosion path control.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The woodland is surrounded by roads, resulting in litter accumulation from drivers. There are areas of erosion and an amphitheatre for scout activities with a fire area. There is a variety of wood stored such as old fencing as well as large oak and ash logs.
Ellenberg values:	min 2, max 7, mean 5.39.
Ellenberg value score 4 and below:	EV 4: wood anemone, silver birch, primrose, pedunculate oak, rowan and white beam. EV3: hairy wood rush. EV2: yellow bird's nest.
Habitat type (UKHab category):	w1f7 - other lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 29)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 2 and 7 inclusive. AWI with EV4 include wood anemone, hairy wood rush, and primrose. Yellow bird's-nest (EV2) was recorded in the field layer. Although this is not listed as an AWI, this plant is listed as ‘endangered’ on the England red list. Frequently occurring species in the field layer included the nitrophobe wood anemone EV4, and the nitrophiles broad buckler fern EV5, bluebell EV6, and bramble EV6. Bluebell may respond to increased nitrogen in moist soils, and bramble is known to

	respond to increased nitrogen Pitcairn et al (2006). No gradient was evident in the woodland and there were no species present indicative of nutrient enrichment i.e., no nettles or cleavers recorded. The nitrophiles present in the field layer were herb Robert EV6 (occasional), wood avens EV7 (occasional), and dog's mercury EV7 (occasional). The species with the highest EV (7) were lords and ladies, wood avens, dog's mercury and elder.

Assessment

Table 6.23 AW_Theme_ID_1498718 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 43.82 DM:41.43 DS:42.92
Operation - Ndep increase (max for site) kg N/ha/yr	1.5
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	14.96
Operation - increase over 0.4 kg N/ha/yr	1.1
Operation - impact extent (ha)	1.07
Operation - impact extent (% of site)	82.76

Operation - impact duration (years until emissions DS = DM at opening yr)	15
Mitigation proposed	M2 Jct3-4 Speed Enforcement, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant (after mitigation)
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.14.1 The DS N deposition after M2 Junction 3-4 mitigation was reduced from 42.99kg N/ha/yr to 42.92kg N/ha/yr, which is still more than double the upper critical load of 20kg N/ha/yr. The increase in N deposition after mitigation is 1.50kg N/ha/yr, which is 15% of the LCL for broadleaved deciduous woodland.
Detailed site investigation did not record any gradient in the vegetation but noted litter and disturbance due to recreation. AWI species recorded in the NAA that are nitrogen -sensitive and could be at risk of loss due to an increase in N deposition include wood anemone, hairy wood rush and primrose. Yellow bird's-nest (EV2), was recorded in the field layer. Along this not listed as an AWI, this plant is listed as ‘endangered’ on the England red list.
There are other typical woodland ground flora that are nitrophiles and could increase in response to increased N deposition, such as herb Robert, wood avens, dog’s mercury, broad buckler fern, bluebell and bramble. However, no gradient was evident in relation to the existing road and there were no species present indicative of nutrient enrichment such as nettles or cleavers. There is a risk that the species that are sensitive to nitrogen could be out-competed by species more responsive to increased N deposition and the vegetation composition at the site could change.
It is predicted that approximately 83% of this site will be affected by increased N deposition. Given the presence of sensitive species, there could be an effect on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 15 years, so is assessed as a permanent and irreversible. Therefore, the impact level has been assessed as major. The effect of a major impact level on a site of national value could be either large or very large. Given the presence of nitrogen-sensitive species and that a high proportion of the site is affected (82.8%), a precautionary approach has been taken and the effect is assessed as very large adverse (significant).

6.15 AW_Theme_ID1420012 AW

Baseline

Table 6.24 AW_Theme_ID1420012 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	76_AW_LWS
Resource importance:	National
Overlapping site:	Foxburrow Wood, Upminster SINC
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.15
Site Description - desk study:	The site description for Foxburrow Wood, Upminster SINC (2006) describes this site as a small ancient wood on acid soils, part of which has been replanted with conifers. The dominant trees are pedunculate oak and silver birch with occasional old rowan and hazel coppice stools. The ground flora is dominated by bramble and bracken. The wood has been planted with Norway maple and wild cherry. There are large areas of planted conifers, mainly spruce. Aerial photos show a relatively closed canopy with a small opening in the southern part of the site. The wood itself is connected to an undesignated woodland of similar size to the south and is surrounded by the M25 to the east, farmland to the north and housing development to the west.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A

Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.25 AW_Theme_ID1420012 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.7 DM: 46.98 DS: 47.62
Operation - Ndep increase (max for site) kg N/ha/yr	0.64
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.41
Operation - increase over 0.4 kg N/ha/yr	0.24
Operation - impact extent (ha)	1.12
Operation - impact extent (% of site)	51.98
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.15.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.64kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 6.4% of this LCL. Foxburrow Wood, Upminster SINC overlaps with this AW.

The citation for Foxburrow Wood, Upminster SINC describes this site as a small ancient wood on acid soils, part of which has been replanted with conifers. The ground flora is described as dominated by bramble and bracken, suggesting a lack of less competitive species that may be sensitive to nitrogen.

However, given the absence of survey data and the area affected (52% of the AW) a precautionary approach has been used and it is considered that increased N deposition has the potential to affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as major adverse, which results in an effect of large adverse (significant).

6.16 AW_Theme_ID1486951 AW

Baseline

Table 6.26 AW_Theme_ID1486951 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	660_AW
Resource importance:	National
Overlapping site:	Shorne and Ashenbank Woods SSSI
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	8.82
Site Description - desk study:	Ancient & Semi-Natural Woodland. Area mainly Deciduous woodland. Lowland Mixed Deciduous Woodland and Broadleaved classifications also present. The ancient woodland is adjacent to deciduous woodland to the east and south and fields to the west and north. The woodland seems dense with no visible gaps or open areas. There is an opening to the southern area that runs along the end of the woodland to a building or farm.
Site Condition - As described in citation/by site manager:	
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A

Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.27 AW_Theme_ID1486951 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 29.31 DM: 28.92 DS: 30.12
Operation - Ndep increase (max for site) kg N/ha/yr	1.2
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	11.99
Operation - increase over 0.4 kg N/ha/yr	0.8
Operation - impact extent (ha)	0.05
Operation - impact extent (% of site)	0.55
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Minor adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.16.1 This small AW block (8.82ha) is entirely within Shorne and Ashenbank Woods SSSI and is therefore assessed as part of that site. This part of the SSSI was not surveyed in 2022 as no access was granted. The NAA of this AW block is only 0.05ha and constitutes 0.5% of the site. Therefore, no effect on site integrity is anticipated as a result of increased N deposition. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of national value could be either slight or moderate. Given the absence of survey information from

this part of the site, and that it forms part of the wider SSSI, a precautionary approach has been taken and the effect is assessed as moderate adverse (significant).

6.17 AW_Theme_ID1493831 AW

Baseline

Table 6.28 AW_Theme_ID1493831 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	173_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.77
Site Description - desk study:	This is an ancient and semi-natural woodland and is listed on the priority habitat inventory as a deciduous woodland (although confidence in main habitat type is low). Site location TQ 3552 5377, post code RH9 8AX. No further desk study information is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	16/08/2022
Field survey habitat parcel descriptions:	The NAA is in an ancient woodland dominated by ash which had severe dieback resulting in a significant amount of standing dead wood from already dead ash trees. The canopy included occasional pedunculate oak. The understorey had occasional to frequent mature midland hawthorn, common hawthorn, field maple and hazel, while dogwood and blackthorn were rare. The field layer was almost completely dominated by creeping bent and wood sorrel was present but infrequent. Those areas without creeping bent comprised bare ground. The entire wood is unfenced and open to cattle grazing which has resulted in no woodland regeneration. The smaller NAA lying approximately 150m to the east of the larger

	NAA was of a similar composition; this smaller area was unfenced, cattle grazed and predominantly ash with dieback and had an understorey of hawthorn and some field maple. The ground flora was predominantly creeping bent.
Lichens:	No lichens on suitable trees
Vegetation gradient:	The woodland is so badly damaged that the ground flora does not exist and so it would be impossible to see a vegetation gradient.
Notes on active management (field survey observations):	There is no management for nature conservation. Current management includes stock grazing throughout the woodland.
Notes on required or beneficial management (field survey observations):	As a priority, fence the woodland to prevent cattle grazing the field layer and thereby allow regeneration. The ash trees are dying and should be allowed to remain where safe, as standing dead wood, to provide valuable wildlife habitat. Plant native species, otherwise the woodland will be lost due to ash dieback.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The ash trees are suffering from severe ash dieback. Overgrazing by cattle is preventing any woodland regeneration, so the woodland will soon be lost if it is not fenced.
Ellenberg values:	min 4, max, mean 5.88
Ellenberg value score 4 and below:	EV4: wood sorrel and pedunculate oak
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Poor (score 25)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 4 and 8 inclusive. One AWI was present (rare), wood sorrel, EV4. This species is listed by Pitcairn et al (2006) as a nitrophobe. Creeping bent (EV 6), a nitrophile which can invade rapidly in response to increased nitrogen (Pitcairn et al.2006), was dominant in the field layer. Other nitrophiles recorded were bramble, EV6 and nettle EV8, which is an indicator of nitrogen enrichment.

Assessment

Table 6.29 AW_Theme_ID1493831 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 36.49 DM: 36.27 DS: 36.82
Operation - Ndep increase (max for site) kg N/ha/yr	0.55
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.48
Operation - increase over 0.4 kg N/ha/yr	0.15
Operation - impact extent (ha)	0.17
Operation - impact extent (% of site)	22.25
Operation - impact duration (years until emissions DS = DM at opening yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.17.1 The increase in N deposition (DS-DM) is 0.55kg N/ha/yr. There are two NAAs within this AW, both supporting broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 5.5% of this LCL.
The site investigation did not record any lichen growth on suitable trees and no vegetation gradient was observed due to the extent of damage to the ground flora. It was noted that ash dieback is severe in the NAA areas and that the presence of livestock trampling is severely affecting ground flora growth and woodland regeneration.
There was one rarely recorded nitrophobic AWI, wood sorrel (EV4). Nitrophilic creeping-bent (EV6) was dominant and can expand rapidly in response to increased nitrogen (Pitcairn et al.2006). Bramble and nettle were present, but occasional, and could increase in response to increased N deposition.
It is considered that the biggest threat to the integrity of this site is the presence of ash dieback and cattle grazing, which is preventing woodland and ground flora regeneration. Increased N deposition within 22.3% of the site may lead to an increase in bramble, nettle and creeping-bent, but these species are already present and this is therefore unlikely to affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at only 1 year, and so is assessed as a temporary and theoretically reversible.
Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.18 AW_Theme_ID1494010 AW

Baseline

Table 6.30 AW_Theme_ID1494010 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	174_AW
Resource importance:	National
Overlapping site:	No

Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.2
Site Description - desk study:	Ancient & semi-natural woodland, mainly deciduous woodland. Surrounded by fields and likely not accessed regularly by the public.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.31 AW_Theme_ID1494010 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 37.28 DM: 36.92 DS: 37.55
Operation - Ndep increase (max for site) kg N/ha/yr	0.63
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.34
Operation - increase over 0.4 kg N/ha/yr	0.23
Operation - impact extent (ha)	0.66
Operation - impact extent (% of site)	55.17
Operation - impact duration (years until emissions DS = DM at opening yr)	1
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse

Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.18.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.63kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 6.3% of this LCL.
This AW is north of the M25 and directly opposite is AW_Theme_ID1493831AW which lies to the south of the M25 and has been surveyed. It is reasonable to assume that this AW may contain a similar species composition to that found in AW_Theme_ID1493831AW as they would have been historically joined together before the construction of the M25. However due to the presence of ash dieback and the level of disturbance by cattle grazing within AW_Theme_ID1493831AW and a lack of survey data for this AW a precautionary approach has been applied. 55.2% of the site is affected by increased N deposition and this could affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 1 year, and so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse, which results in a moderate adverse effect (significant).

6.19 AW_Theme_ID1499144 AW

Baseline

Table 6.32 AW_Theme_ID1499144 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	119_AW
Resource importance:	National
Overlapping site:	Woodlands West of Shoreham LWS
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	1.34
Site Description - desk study:	This AW is within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.33 AW_Theme_ID1499144 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.56 DM: 45.11 DS: 46.77
Operation - Ndep increase (max for site) kg N/ha/yr	1.66
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.64
Operation - increase over 0.4 kg N/ha/yr	1.26
Operation - impact extent (ha)	0.73
Operation - impact extent (% of site)	54.44
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse

Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.19.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.66kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 16.6% of this LCL. This AW is part of a woodland block and is adjacent to AW_Theme_ID14991454 AW, AW_Theme_ID1499250 AW and part of a larger area within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS. The area affected is 54.4% of the AW and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible. Considering the area affected, time to reduce to DM levels and precautionary approach applied in the absence of site survey data, it is considered that an increase in N deposition has the potential to affect the integrity of the site.
Therefore, the impact level has been assessed as moderate adverse and it is considered reasonable to assess the effect as moderate adverse (significant).

6.20 AW_Theme_ID1499145 AW

Baseline

Table 6.34 AW_Theme_ID1499145 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	119_AW
Resource importance:	National
Overlapping site:	Woodlands West of Shoreham LWS
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	1.5
Site Description - desk study:	This AW is within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.35 AW_Theme_ID1499145 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.56 DM: 45.11 DS: 46.77
Operation - Ndep increase (max for site) kg N/ha/yr	1.66
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.64
Operation - increase over 0.4 kg N/ha/yr	1.26
Operation - impact extent (ha)	1.13
Operation - impact extent (% of site)	75.37
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse

Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.20.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.66kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 16.6% of this LCL. This AW is part of a woodland block and is adjacent to AW_Theme_ID14991454 AW, AW_Theme_ID1499250 AW and part of a larger area within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS. The area affected is 75.4% of the AW and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as a temporary and theoretically reversible. Considering the area affected, time to reduce to DM levels and precautionary approach applied in the absence of site survey data, it is considered that an increase in N deposition has the potential to affect the integrity of the site.
Therefore, the impact level has been assessed as moderate adverse and it is considered reasonable to assess the effect as moderate adverse (significant).

6.21 AW_Theme_ID1499250 AW

Baseline

Table 6.36 AW_Theme_ID1499250 AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	119_AW
Resource importance:	National
Overlapping site:	Woodlands West of Shoreham LWS
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	6.83
Site Description - desk study:	This AW is within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.37 AW_Theme_ID1499250 AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.56 DM: 45.11 DS: 46.77
Operation - Ndep increase (max for site) kg N/ha/yr	1.66
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.64
Operation - increase over 0.4 kg N/ha/yr	1.26
Operation - impact extent (ha)	0.11
Operation - impact extent (% of site)	1.55
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.21.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.66kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat with a dense canopy cover. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 16.6% of this LCL. This AW is part of a woodland block and is adjacent to AW_Theme_ID14991454 AW, AW_Theme_ID14991455 AW and part of a larger area within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS. The area affected is only 1.5% of the AW and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible. Considering the area affected, time to reduce to DM levels and precautionary approach applied in the absence of site survey data, it is not considered that an increase in N deposition will affect the integrity of the site.
Therefore, the impact level has been assessed as negligible adverse and it is considered reasonable to assess the effect as slight adverse (not significant).

6.22 Barber's Wood And Lane LWS

Baseline

Table 6.38 Barber's Wood And Lane LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	72_AW_LWS
Resource importance:	County
Overlapping site:	Barber's Wood AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	8.42

Site Description - desk study:	NGR: TQ479 999. The site is designated an LWS and AW. The LWS is larger than the AW and extends north-east along a track/disused lane. The citation states: Apart from a small area of recent loss close to the M25, this wood's outline remains the same as it did when recorded in the Ordnance Survey map of 1881. Various combinations of trees dominate different parts of the wood, and much of it is densely shaded but the wood retains several ancient woodland indicator species.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown other than from the LWS citation, which describes the canopy as densely shading and the many areas being devoid of ground flora. This suggests lack of management as a pressure.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.39 Barber's Wood And Lane LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.3 DM: 45.67 DS: 47.48
Operation - Ndep increase (max for site) kg N/ha/yr	1.81
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	18.12
Operation - increase over 0.4 kg N/ha/yr	1.41
Operation - impact extent (ha)	3.87
Operation - impact extent (% of site)	45.93
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.22.1 No survey was undertaken in 2022 as access was not granted. The LWS overlaps with Barber's Wood AW, except the LWS also includes a wooded lane which extends beyond the main woodland block. The increase in N deposition (DS-DM) is 1.81kg N/ha/yr and approximately 18% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. It is estimated that 45.9% of the site is affected by increased N deposition.
The LWS citation describes the ground flora as being absent in many areas, particularly under the dense shading canopy, with bramble and common nettle occurring where there is greater light penetration. The ancient woodland indicator pignut is found and moschatel occurs in damp patches close to the stream.
Pignut and moschatel are not considered to be potentially sensitive to N deposition.
Nitrophilic bramble (EV6, known to increase rapidly) and nettle (EV8, an indicator of nutrient enrichment) may increase with additional N deposition (Pitcairn et al, 2006).

In the absence of survey data, it is unknown whether nitrogen sensitive species are present. Should they be present, then given the size of the affected area, it is likely that there will be an adverse effect on the site's integrity.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as moderate adverse, which results in a slight effect (not significant).
However, as most of the affected area is within an area identified as nationally important ancient woodland (Barbers Wood AW), the assessment for the latter site should take precedence. The assessment for Barbers Wood AW concludes a moderate effect (significant).

6.23 Barber's Wood AW

Baseline

Table 6.40 Barber's Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	72_AW_LWS
Resource importance:	National
Overlapping site:	Barber's Wood AW, Barber's Wood And Lane LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	6.89
Site Description - desk study:	The site is an AW and designated as Barber's Wood and Lane LWS. It lies along the north side of the M25. The LWS citation describes the site as hornbeam coppice providing the main structural component but with various other trees species (ash, pedunculate oak and sycamore) dominating in different parts of the wood. The southern corner has been replanted with sycamore, with areas of scrubby blackthorn growing nearby. The citation also describes the ground flora as being absent in many areas, particularly under the dense shading canopy, with bramble and common nettle occurring where there is greater light penetration. The ancient woodland indicator pignut is also found and moschatel occurs in damp patches close to the stream.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Pressures and threats could not be assessed during the site investigation due to the limited access.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.41 Barber's Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.3 DM: 45.67 DS: 47.48
Operation - Ndep increase (max for site) kg N/ha/yr	1.81
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	18.12
Operation - increase over 0.4 kg N/ha/yr	1.41
Operation - impact extent (ha)	3.61
Operation - impact extent (% of site)	52.34
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.23.1 No survey was undertaken in 2022 as access was not granted. The AW overlaps with Barber's Wood and Lane LWS. The increase in N deposition (DS-DM) is 1.81kg N/ha/yr and approximately 18% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. It is estimated that 52.3% of the site is affected by increased N deposition.
The LWS citation describes the ground flora as being absent in many areas, particularly under the dense shading canopy, with bramble and common nettle occurring where there is greater light penetration. The ancient woodland indicator pignut is found and moschatel occurs in damp patches close to the stream.
Pignut and moschatel are not considered to be potentially sensitive to N deposition.
Nitrophilic bramble (EV6, known to increase rapidly) and nettle (EV8, and indicator of nutrient enrichment) may increase with additional N deposition (Pitcairn et al, 2006).
In the absence of survey data, it is unknown whether nitrogen sensitive species are present. Should they be present,

then given the size of the affected area, it is likely that there will be an adverse effect on the site's integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as moderate adverse. The effect of a moderate impact level on a site of national value could be either moderate or large. Considering the citation information and lack of survey data, a precautionary approach has been taken and significance is assessed as moderate (significant).

6.24 Blue Bell Hill Banks and Verges LWS

Baseline

Table 6.42 Blue Bell Hill Banks and Verges LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	456_LWS_RNR, 457_LWS_RNR, 458_LWS_RNR, 459_LWS_RNR, 473_RNR, 474_RNR
Resource importance:	County
Overlapping site:	Wouldham To Detling Escarpment SSSI
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	9.98
Site Description - desk study:	The LWS encompasses the semi-natural habitats along the verges of the A229 with some overlap with Unit 11 of Wouldham to Detling Escarpment SSSI. The LWS citation describes the site as comprising a series of wide, chalky verges and banks associated with the steep vertical chalk cliffs formed by the road cutting through the North Downs and which have become an important botanical site, particularly for orchid species. The flora consists of a mix of species associated with disturbed calcareous soil, including wild parsnip, wild carrot, vervain, crosswort and hedge bedstraw. Early colonising short ephemerals such as eyebright and various bryophytes are also found. Herbs characteristic of thin chalk soils have also become abundant and include kidney vetch, carline thistle, small scabious, yellowwort, autumn gentian, marjoram, wild basil and dwarf thistle. Common broomrape occurs on the barer areas of chalk. The flora has developed further in places, and rock rose, horseshoe vetch and grasses such as upright brome and quaking-grass are creating a more

	permanent chalk turf in some areas. A diversity of orchids are present, with abundant pyramidal orchid, bee orchid, common spotted orchid and man orchid, and common twayblade, fly orchid and broad-leaved helleborine occur under scrub. At the most southerly end of the site, there is a damp area which supports a large population of common spotted orchid in addition to hybrids with southern marsh orchid. Stinking hellebore is also recorded from the north end of the site. Scrub has developed on the slightly deeper soils, which now support ash, wayfaring-tree, dogwood, rose and hawthorn, and is particularly common on the upper slopes of the hill, transitioning to woodland. Burnet rose, a very local shrub in Kent, is present on the western slopes below the main hill. In the wooded areas white helleborine and sanicle are found. The site supports a good diversity of invertebrate species including Adonis blue, chalk hill blue and brown argus and green hairstreak butterflies.
Site Condition - As described in citation/by site manager:	Blue Bell Hill LWS description does not provide a site condition. However, part of Habitat parcel 13 of the LWS overlaps with Wouldham to Detling Escarpment SSSI, Unit 11 of this SSSI (Warren Road Bank), which was assessed by Natural England in 2021 as 'Unfavourable declining' in 2021. NE's condition assessment states that the Unit was accessed from the road due to access issues and that unconsented work on site means the Unit is unfavourable declining until the extent of damage can be assessed thoroughly. No information as to the nature of the unconsented work or the indicators of condition were provided. From aerial imagery, where the LWS and SSSI overlap, approximately half of the overlap is scrub/secondary woodland and approximately half of the overlap is established woodland. Most of Unit 11 of the SSSI lies outside the LWS and is established woodland.
Dates surveyed (2021 and 2022):	06/07/2022, 20/07/2022, 03/08/2022, 04/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1 is a species rich, unimproved calcareous grassland roadside verge 10 to 15m wide, with 42 species recorded in the transect and 20 species in the quadrat. The grassland is forb dominated with some grasses and sedges. Species associated with disturbed calcareous ground included wild carrot and hedge bedstraw. Herbs characteristic of thin chalk soils included occasional yellow wort and broomrape (sp). Herbs characteristic of more established chalk grassland included rare horseshoe vetch and rare quaking grass. Common spotted orchid was occasional and pyramidal orchid was rare. A one-metre-wide gravel soak away ran along the centre of the strip. It is bounded on the western side by low scrub and newly planted native tree species still in their protective tubes. Habitat parcel 2a: 10 m wide planted tree strip on a bank between the main road and an access road. There trees were young and native, with an estimated age 25 to 35 years old. Field maple and ash are abundant in the canopy, wild privet and wayfaring tree occasional in

	the understorey, and ivy is abundant in the field layer. Three AWI were observed, field maple, wayfaring tree and guelder rose. All ash displayed advanced die back. Habitat parcel 2b: Small area of tall calcareous grassland vegetation dominated by forbs with occasional false oat-grass. Dogwood, a native shrub, was frequent in the sward. No obvious management but possibly cut occasionally. Management would be to cut this at least annually or more often if wishing to remain as grassland otherwise it will revert to scrub within a few years. Habitat parcel 3: Young woodland which has yet to develop a closed canopy but has a very dense understorey predominantly of hazel with frequent wild privet. The open canopy consists of beech, field maple and whitebeam. The heavily shaded ground layer is dominated by ivy. Both broadleaved helleborine and pyramidal orchid are occasional. The woodland is on a steep slope and shows no signs of disturbance or ongoing management. Habitat parcel 4: Dense semi plantation woodland on a slope adjacent to a lay-by heavily used by truckers. Litter is abundant throughout and human faeces and toilet paper wherever there is easy access. The canopy is dominated by ash, field maple and sycamore with dogwood dominant at the southern end and only occasional standards. The ground layer is sparse or dominated by ivy in slightly lighter patches. No AWIs and of very limited nature conservation value. Generally mixed scrub at the southern end dominated by dogwood with only occasional sycamore and ash standards. Habitat parcel 5: Mature heavily shaded secondary woodland dominated by sycamore with frequent ash over an understorey of frequent field maple and occasional dogwood and wayfaring tree. The ground layer is dominated by ivy. Despite the heavy shading there are many seedlings and saplings present. Largely undisturbed but some areas of fly tipping on the edge. Towards the southern end the woodland is younger and dominated by silver birch with scattered sycamore and beech Habitat parcel 6: The grassland is on a steep bank with young, scattered ash trees sandwiched between the slip road and the main road. The grassland is reverting to dogwood scrub. The ash trees have severe dieback. The sward is too tall for many calcareous grassland species to compete. To retain its grassland status, this area requires cutting back and the dogwood removed. Habitat parcel 7. Viewed from road. Dense overgrown hedge of young tree/standards on a steep roadside bank. Trees present are sycamore, whitebeam, ash, cherry and silver birch over dogwood and wayfaring tree. Ground layer dominated by ivy. Habitat parcel 8: This is a small, isolated pocket of secondary woodland between the A229 and Rochester Road on a raised bank to 10 m high extending in all directions. Frequently

	occurring young trees are ash, beech and field maple, and hazel is frequent in the understorey. The wood has a canopy which allows dappled sunlight through to most parts. There was significant ash die back. The field layer is dominated by ivy, although seventeen species were recorded within the 4 x 4 m quadrat. AWI recorded in the canopy included frequent field maple and the field layer included frequent field maple seedlings, broad-leaved helleborine, occasional sanicle and wayfaring trees and rare spurge laurel and black bryony. There is some rubbish present on site from the adjacent road. The grass cuttings from the adjacent grassland are dumped just inside the woodland. Habitat parcel 9: This calcareous grassland was a flat area between the secondary woodland to the west (i.e. Habitat parcel 8) and the slip road (Rochester Road) to the east. At its widest, the grassland has an approximate width of 15m. It is fairly species rich with a high forb cover. Thirty-eight species were recorded across the ~150m length transect and over 25 species were recorded in the 2 x 2 m quadrat. Frequently occurring species were upright brome, glaucous sedge, heath bedstraw, perforate St John's wort and marjoram, and the other species were occasional or rare. There was some scrub regrowth, but the grassland appears to be cut on a regular basis with the cuttings deposited at the edge of the wood. Habitat parcel 10 Mixed, predominantly broadleaved woodland with frequent yew, particularly on the eastern side. Structurally varied. Species in the canopy include sycamore, beech and silver birch. In the understorey is occasional wayfaring tree, wild privet, hazel and spurge laurel. The ground layer is dominated by ivy with occasional dog's mercury and wood false brome; Habitat parcel 11. The habitat was mixed scrub with scattered mature ash and sycamore. The scrub had abundant hawthorn, wild privet, and wayfaring tree. Frequent scrub species included dogwood and blackthorn, while field maple, buddleia, sycamore and ash were occasional. The ground layer was dominated by ivy, and in places frequent lords and ladies, old-man's beard and stinking hellebore. Habitat parcel 12. Rank calcareous grassland along a narrow verge dominated by cocks-foot and false oat-grass, but with numerous calcareous indicators including wood false-brome, wild basil, marjoram, viper's bugloss, glaucous sedge, wild carrot, blue fleabane and salad burnet. The grassland is probably mown once a year with arisings left in place. The sward is very open. Habitat parcel 13. Steep-sided cutting, dense woodland and scrub. Secondary woodland mostly on a very steep slope/cliff, probably developed from calcareous grassland within the last 30 years. An open canopy of occasional to frequent beech, whitebeam, silver birch, ash and sycamore over a very dense understorey of hazel, wayfaring tree, field maple and wild

	privet. The ground layer is dominated by ivy with quite frequent broadleaved helleborine. Some calcareous grassland indicators such as wild basil have been able to persist in places. Some planting of shrubs has taken place in the last ten years as evidenced by tree guards, but there are no signs of ongoing management. A small area of more mature woodland does occur towards the centre with a closed canopy of ash and sycamore over hazel, wild privet and field maple. The ground layer is heavily shaded and dominated by ivy with frequent dog's mercury.
Lichens:	No lichens on suitable trees.
Vegetation gradient:	No vegetation gradient observed in any of the 13 Habitat parcels.
Notes on active management (field survey observations):	Habitat parcel 1: The grassland appears to be regularly mown. There is native tree planting in a strip along at the west of the Habitat parcel, parallel to the minor road. Habitat parcel 2a: No active management. Habitat parcel 2b: No obvious management but sward possibly cut occasionally. Habitat parcel 3: No recent management evident. Very densely shaded coppice woodland with ivy dominant on ground. Habitat parcels: 4, 5, 6, 7, 8: No management observed. Habitat parcel 9: Piles of dried grass at the edge of the wood suggest the area is mown regularly. Habitat parcel 10: No signs of management. On the cliff side woodland appears to be in a state of natural succession. Older woodland to the east with frequent to abundant yew. Habitat parcel 11: No management observed. Habitat parcel 12: Mown at least annually, with cuttings left on site. Habitat parcel 13: No current management but old tree guards indicate some planting perhaps 20 years ago, with some more recent supplementary planting of shrubs in the last ten years.
Notes on required or beneficial management (field survey observations):	The Roadside Nature Reserve descriptions for Bluebell Hill LWS state the calcareous grassland areas are cut once in early April and again in late October. The following observations were made during the 2022 site surveys: Habitat parcel 1: Present management appears sufficient. Habitat parcel 2a: Litter clearance. Habitat parcel 2b: Cut the sward at least annually or more often to retain as grassland otherwise it will revert to scrub (dogwood) within a few years. Habitat parcel 3: Re-instate coppicing; thin. Habitat parcel 4: Thinning to allow more light in. Removal of litter. Provision of a toilet for the people who use the lay-by. Habitat parcel 5: Removal of fly tipping. The woodland requires thinning. Habitat parcel 6: Grassland is being invaded by dogwood, which is now abundant. The area requires regular mowing/cutting to return to a calcareous grassland sward. Habitat parcel 7: selective hedgerow tree thinning. Habitat parcel 8: Thinning of young canopy trees, rubbish clearance and removal of laurel seedlings. Habitat parcel 9: At least continue with annual mowing after the flowering plants have set seed in late summer, and preferably mowing

	again at the start of spring. Habitat parcel 10: control of wall cotoneaster (Wildlife and Countryside Act Schedule 9 species). Habitat parcel 11: Clear some open space with the scrub, including some removal of dense ivy to allow woodland ground flora to flourish; install bat and bird boxes on mature trees. Habitat parcel 12: continue to mow in spring and late summer and remove cuttings, rather than leave them on site, to reduce soil fertility. Habitat parcel 13: Thinning of the canopy, reinstatement of coppicing, and removal of some ivy which dominates a heavily shaded ground layer.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: Some areas close to the road are dried out and the plants are wilted. Habitat parcel 2a: all ash displayed advanced die-back. Habitat parcel 2b: lack of management. Habitat parcel 3: lack of management. Habitat parcel 4: Litter/fly tipping frequent. Also area is used as a toilet by people parked up on the adjacent lay-by; on day of survey, rubbish bins overflowing; ash die-back observed. Habitat parcel 5: Dense woodland canopy with little light reaching the ground layer; lack of woodland management; fly tipping; ash dieback. Habitat parcel 6: Lack of management; ash die-back. Habitat parcel 7: lack of management. Habitat parcel 8: lack of woodland management, ash die back, abundant ground layer ivy, dumped rubbish, including grass cuttings from the adjacent grassland are deposited just inside the woodland. Habitat parcel 9: grassland in good condition, although litter removal needed. Habitat parcel 10: invasives present: wall cotoneaster. Habitat parcel 11: Lack of management, dense impenetrable scrub in northern half of the Habitat parcel, with dominant ivy out-competing sensitive woodland ground flora across much the accessible area to the south. Habitat parcel 12: It is unclear whether the grassland is mown once or twice a year; twice a year is preferable (early spring and late summer), with removal of cuttings. Part of Habitat parcel 13 is Unit 11 of Wouldham to Detling Escarpment SSSI (Warren Road Bank) and was assessed as 'Unfavourable declining' in 2021. The condition assessment states that the site was accessed from the road due to access issues and that unconsented work on site means the unit is unfavourable declining until the extent of damage can be assessed thoroughly. No information as to the nature of the unconsented work or the indicators of condition are given.
Ellenberg values:	Habitat parcel 1: min 2, max 8, mean 4.18; Habitat parcel 2a: min 4, max 7, mean 5.68; Habitat parcel 2b: min 4, max 7, mean 5.68; Habitat parcel 3: min 2, max 7, mean 4.96 Habitat parcel 4: min 4, max 8, mean 5.77 Habitat parcel 5: min 4, max 8, mean 5.90 Habitat parcel 6: min 3, max 7, mean 5.54;

	Habitat parcel 7: incomplete data, viewed from road only; Habitat parcel 8: min 3, max 8, mean 5.35; Habitat parcel 9: min 2, max 7, mean 4.04; Habitat parcel 10 min 3, max 8, mean 5.50; Habitat parcel 11: min 3, max 8, mean 5.64; Habitat parcel 12 : min 2, max 8, mean 4.77 Habitat parcel 13: min 2, max 7, mean 5.81.
Ellenberg value score 4 and below:	Habitat parcel 1: Twelve species with EV4: yarrow, agrimony, mouse-ear, heath bedstraw, oxeye daisy, black medick, ribwort plantain, primrose, yellow rattle, ragwort, whitebeam and yellow oat-grass. Seven species with EV3: pyramidal orchid, quaking grass, common centaury, dwarf thistle, common spotted orchid, cat's ear and hawkweed. Nine species with EV2: kidney vetch, yellow wort, glaucous sedge, carline thistle, horseshoe vetch, fairy flax, common bird's foot trefoil, small scabious and hairy violet. Habitat parcel 2a: Two species with EV4: silver birch and common whitebeam. Habitat parcel 2b: Eight species with EV4: yarrow, agrimony, heath bedstraw, oxeye daisy, marjoram, ribwort plantain, selfheal and ragwort. One species with EV3: pyramidal orchid. One species with EV2: glaucous sedge. Habitat parcel 3: Two species with EV2: yellow wort and hairy violet. Three species with EV3: pyramidal orchid, ploughman's spikenard, hawkweed oxtongue. Two species with EV4: broad-leaved helleborine and common whitebeam. Habitat parcel 4: Two species with EV4: silver birch and wild basil Habitat parcel 5: One species with EV4: silver birch Habitat parcel 6: Species with EV4: heath bedstraw, oxeye daisy, marjoram. Species with EV3: pyramidal orchid and meadow vetchling; Habitat parcel 7: incomplete data, viewed from road only; Habitat parcel 8: Species with EV4: broad-leaved helleborine, wild strawberry and pedunculate oak. Species with EV3: pyramidal orchid and common spotted orchid. Habitat parcel 9: fourteen species with EV4: yarrow, agrimony, silver birch, broad leaved helleborine, wild strawberry, heath bedstraw, autumn hawkbit, oxeye daisy, black medick, marjoram, ribwort plantain, selfheal, pedunculate oak and ragwort. Eight species with EV3: upright brome; greater knapweed, common spotted orchid, meadow vetchling, sainfoin, common milkwort, salad burnet, and wood sage. Species with EV2: kidney vetch, yellow wort, glaucous sedge, carline thistle, horseshoe vetch, mouse ear hawkweed, small scabious and hairy violet. Habitat parcel 11: EV4: marjoram; EV3 stinking hellebore;

	Habitat parcel 12: Five species with EV2: hairy violet, bird's foot trefoil, carline thistle, glaucous sedge and yellow wort. Eight species with EV3: pyramidal orchid, quaking grass, common centaury, blue fleabane, cat's ear, common sainfoin, salad burnet and wood sage.17 species with EV4. Habitat parcel 13: EV2: goldmoss stonecrop and biting stonecrop. No species with EV3. EV4: viper's bugloss and buck's horn plantain.
Habitat type (UKHab category):	Habitat parcel 1: g2a - Lowland calcareous grassland; Habitat parcel 2a: w1g - Other woodland; broadleaved; Habitat parcel 2b: g2 - Calcareous grassland; Habitat parcel 3: w1g - Other woodland; broadleaved; Habitat parcel 4: w1g - Other woodland; broadleaved; Habitat parcel 5: w1g - Other woodland; broadleaved; Habitat parcel 6: g2 - Calcareous grassland, secondary codes 10 (habitat mosaic: scattered scrub and 11 (scattered trees); Habitat parcel 7: h2 - Hedgerows; Habitat parcel 8: w1g - Other woodland; broadleaved; Habitat parcel 9: g2a - Lowland calcareous grassland; Habitat parcel 10: w1g - Other woodland; broadleaved; Habitat parcel 11: h3h - Mixed scrub with scattered mature trees; Habitat parcel 12: g2 - Calcareous grassland; Habitat parcel 13: w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Habitat parcel 1: good; Habitat parcel 2a: moderate (score 27) ; Habitat parcel 2b: moderate; Habitat parcel 3: moderate (score 28); Habitat parcel 4 poor (score 21); Habitat parcel 5: moderate (score 27) ; Habitat parcel 6: moderate; Habitat parcel 7: good; Habitat parcel 8: moderate (score 27) Habitat parcel 9: good; Habitat parcel 10: moderate (score 31) Habitat parcel 11: moderate; Habitat parcel 12 good; Habitat parcel 13: moderate (27 points)
Limitation(s):	Habitat parcel 7: viewed from road only/data incomplete. Habitat parcel 10: Impossible to follow the transect line as it was on a steep slope directly above a cliff. Viewing the western part of the survey area also difficult for the same reason. The habitat mainly surveyed from the adjacent footpath just to the east of the survey area. Habitat parcel 11: northern section inaccessible due to dense scrub.
Habitat sensitivity - Area affected by Ndep:	The NAAs support calcareous grassland and woodland habitats with a number of species with low EVs that are potentially sensitive to nitrogen. However, there is no yew woodland (the most sensitive habitat) and calcareous grassland (for which the site is designated) only occurs in five of the 13 habitat parcels.

Assessment

Table 6.43 Blue Bell Hill Banks And Verges LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved, mixed and yew woodland (Taxus baccata woodland)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	5
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 57.16 DM: 51.57 DS: 53.42
Operation - Ndep increase (max for site) kg N/ha/yr	2.28
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	45.58
Operation - increase over 0.4 kg N/ha/yr	1.88
Operation - impact extent (ha)	7.74
Operation - impact extent (% of site)	77.49
Operation - impact duration (years until emissions DS = DM at opening yr)	8
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.24.1 According to the citation for the LWS, the key characteristic of the LWS is calcareous grassland on disturbed soils, supporting an abundance of orchids and other species typical of open grassland. However, aerial imagery and site survey suggests that most of the site is now scrub and woodland or has been planted with trees. During the survey, only five of the 13 parcels surveyed support calcareous grassland and some of these are undergoing succession to rank grassland and scrub due to lack of management. One block of the LWS (Habitat parcel 13) overlaps with Unit 11 of Wouldham to Detling Escarpment SSSI and this area supports woodland which is in 'unfavourable declining' condition. The focus of this assessment is on the calcareous grassland, as this is the reason for designation of the LWS.

6.24.2 The critical load range for the LWS has been assumed to be the same as that of the most sensitive habitat of yew woodland in Wouldham to Detling Escarpment SSSI, which is 5-15kg N/ha/yr. However, there was no yew woodland recorded in the LWS during the site survey and calcareous grassland is the key habitat in the LWS, which has a critical load range of 15-25 kg N/ha/yr and therefore it is arguable that this range is more appropriate for this site. The predicted base year N deposition is 57.6kg N/ha/yr, which is in great excess of the critical loads for either habitat. The increase in N deposition (DS-DM) is 2.28kg N/ha/yr and it is estimated that 77.5% of the site is affected by increased N deposition. However, not all of the NAA, as noted above, supports calcareous grassland and therefore the extent of sensitive habitat within the LWS is smaller than this.

6.24.3 The species present in the calcareous grassland habitat parcels (1, 2b, 6, 9 and 12) are generally characteristic of open swards on free-draining, often thin or disturbed calcareous soils. Many are nitrogen-sensitive, with EVs of 2 and 3. An increase in nitrogen could accelerate the development of a rank sward dominated by competitive grasses and eventually scrub. Succession to a rank sward and to scrub is already evident in habitat parcels 2b, 6 and 12. However, to be precautionary, it is assumed that there could be an adverse effect on site integrity, even though not all of the site area affected (77.5%) supports calcareous grassland.

6.24.4 It is of note that any existing increase in scrub and woodland is detrimental to the value of the calcareous grassland within the LWS. The succession to scrub is likely to mask any changes due to increased N deposition, but increased N deposition will make it more difficult to revert scrub to grassland. Therefore, it is possible that permanent changes have already taken place on the site as scrub has replaced grassland. However, with respect to the proposed scheme, the time taken for DS NOx emissions to reduce to DM levels is estimated at 7 years, so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate, resulting in a slight effect (not significant).

6.25 Bowers Gifford Grasslands LWS

Baseline

Table 6.44 Bowers Gifford Grasslands LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	8_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	43.48
Site Description - desk study:	The site is designated as an LWS and lies to the south of the A13 (NGR: TQ747 875). The LWS citation describes the site as a series of unintensively managed hill-slope grasslands rich in flowers supporting diverse invertebrate populations and providing a semi-natural extension to the grasslands and marshes to the south. Its principal interest is the large population of hairy vetchling spread across the lower slopes. The site is described as supporting Lowland Meadows priority habitat and plants such as meadow barley, meadow brome, grass vetchling, wild carrot, burnet saxifrage, autumn hawkbit, corn parsley, hairy buttercup and common fleabane.
Site Condition - As described in citation/by site manager:	Unknown - not provided in citation.

Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.45 Bowers Gifford Grasslands LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.19 DM: 37.6 DS: 38.01
Operation - Ndep increase (max for site) kg N/ha/yr	0.41
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	2.07
Operation - increase over 0.4 kg N/ha/yr	0.01
Operation - impact extent (ha)	0.06
Operation - impact extent (% of site)	0.13
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.25.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.41kg N/ha/yr and 2.1% of the LCL for neutral grassland (low and medium altitude hay meadows) of 20kg N/ha/yr. The area affected is a narrow strip of a maximum 10m width along the northern boundary of the site. The total area is 0.06ha (0.1% of the site). The NAA may support some of the sensitive species listed in the citation, such as hairy vetchling, grass vetchling, wild carrot, burnet saxifrage, autumn hawkbit, corn parsley, hairy buttercup and common fleabane. The CL range for

neutral grassland is 20-30kg N /ha/yr and this is for low and medium altitude hay meadows, which are characteristically lower in nutrients than the type of grassland at this site. It is possible that an increase in N deposition could enable the more competitive rank grassland species to expand at the expense of the more sensitive forb species. However, this is such a small proportion of the site that there is unlikely to be an effect on the key characteristics of the site or overall site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible. Although no survey information is available, the NAA is very small and lack of survey data does not influence the outcome of the assessment. The impact level has been assessed as negligible adverse, which results in a neutral effect (not significant).

6.26 Bridge Woods AW

Baseline

Table 6.46 Bridge Woods AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	181_AW, 254_AW
Resource importance:	National
Overlapping site:	Bridge Woods, Burham LWS
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	135.39
Site Description - desk study:	The ancient woodland is large and lies west of the M2 and A229 (post code ME5 9QG. NGR: TQ739 634). The inventory of Ancient Woodland for England describes the area within 200m of the affected road network as ancient and semi-natural woodland. Part of the AW is designated as Bridge Woods, Burnham LWS, although there is one area of the AW not included in this LWS. See Bridge Woods, Burham LWS for the designation description.
Site Condition - As described in citation/by site manager:	The Bridge Woods, Burham LWS description (Dec 2011) states that the wood was formerly managed as coppice with standards (sweet chestnut) and that much of the woodland has been unmanaged for years. Some coppicing has been re-instated. From the description, the woodland appears in reasonable condition. The LWS description states that management

	has lapsed across most of the site and that small areas have been planted with non-native conifers.
Dates surveyed (2021 and 2022):	9/06/2021 and 23/6/2022 and 03/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1 : deciduous woodland in close proximity to go-karting track. Many areas of the woodland are currently in use as a forest school, so there is a lot of human disturbance and bare earth closer to the activity centre. This woodland had abundant sweet chestnut and was predominantly neglected coppice. Forest school activities have opened up glades in the woodland, which gave good field layer diversity. Habitat parcel 2: deciduous woodland adjacent to a go-karting track. Sweet chestnut was abundant in the canopy, with occasional ash (with dieback). Bramble was abundant in the understorey, with rare sweet chestnut. Little light reached the woodland floor here as historic coppicing had been neglected. There are some footpaths into the woodland from the go karting track, various amounts of litter across woodland. Habitat parcel 3: a dense woodland little used by the public, the only track through was a narrow mountain-bike path. Areas to the north of the Habitat parcel had dense ivy cover on the woodland floor. Not a very diverse woodland, with frequent sweet chestnut and ash in the canopy and frequent brambles in the understorey. Oak and beech were rare, present as large standards. The field layer had frequent to locally abundant dog's mercury, and abundant bare ground. The ivy cover was dense at the north of this Habitat parcel. Habitat parcel 4: Old sweet chestnut coppice with frequent hornbeam and occasional oak and ash. Understorey sparse but hazel and hawthorn are most frequent. The ground layer is heavily shaded and consists only of the dead flower stems of bluebell over large areas. Six AWIs are present including wood spurge. More open areas are dominated by bramble. Occasional patches of dog's mercury are present in the northern part. A large amount of dead wood is present. Area is used by dog walkers but does not appear to be heavy use. Little sign of management except for one open area of recently coppiced sweet chestnut. Habitat parcel 5: ash dominated woodland with hornbeam and sweet chestnut common within the canopy. Old coppice that appears to be currently unmanaged with a hawthorn understorey and bluebell ground flora with much bare ground. Ferns also common. Footpaths within the woodland, heavily shaded.
Lichens:	No suitable trees for lichens
Vegetation gradient:	No vegetation gradients noted on any of the Habitat parcels.

Notes on active management (field survey observations):	Neglected coppice.
Notes on required or beneficial management (field survey observations):	Re-instatement of rotational coppice and creating open space in the woodland.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey noted the invasive species laurel in Habitat parcel 1 and some ash dieback in Habitat parcels 2 and 5.
Ellenberg values:	Habitat parcel 1, min 3, max 8, mean 5.4; Habitat parcel 2: min 4, max 7, mean 5.5; Habitat parcel 3: min 3, max 8, mean 5.53; Habitat parcel 4, min 4 max 8, mean 5.84; Habitat parcel 5, min 4 max 8, mean 5.91
Ellenberg value score 4 and below:	Nine species with EV4 and two of EV 3 were recorded. Habitat parcel 1: EV4: wood anemone, silver birch, wild strawberry, primrose, self heal, pedunculate oak, rowan and heath speedwell. EV3: sweet vernal grass and bracken. Habitat parcel 2: species with EV4: wood anemone, silver birch, wild strawberry, primrose and pedunculate oak. Habitat parcel 3: Species with EV 4: wood anemone, silver birch, primrose, and pedunculate oak. Habitat parcel 4: species with EV4: silver birch and pedunculate oak. Habitat parcel 5: EV 4: tufted hair grass, silver birch and wood anemone.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1: poor (score 22); Habitat parcel 2: moderate (score 29) Habitat parcel 3: score 31 (moderate); Habitat parcel 4: score 27 (moderate); Habitat parcel 5 (moderate, score 32)
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Survey of the five Habitat parcels recorded species with every EV between 3 and 8 inclusive. Overall, 11 nitrogen sensitive species of EV4 or less were recorded, including nine species with EV4 and two species with EV3. Habitat parcel 1 recorded the most nitrogen-sensitive species (10 out of 11, with only wavy hair grass not recorded in Habitat parcel 1). Two AWI, both of EV4 were recorded: wood anemone (a nitrophobe, in Habitat parcels 1,2,3 and 5) and primrose (a nitrophobe, in Habitat parcel 1). A species of violet was present in all surveyed Habitat parcels; as it was not in flower it could not be identified, but has potential to be common dog violet, EV4, a nitrophobe and sensitive to nitrogen. Wild strawberry, EV4, was recorded in Habitat parcels 1 and 2.

	The following nitrophiles were frequent in the field layer of at least one Habitat parcel: wood avens EV7, dog's mercury EV7 (a species known to respond to increased nitrogen), bluebell (may respond to increased nitrogen in moist soils) and ivy EV7. Indicators of nutrient enrichment, EV8 were present as follows: hedge wound wort (Habitat parcels 1 and 5), cleavers (in Habitat parcel 5) and nettle (in Habitat parcels 4 and 5). Of the five Habitat parcels surveyed, Habitat parcel 1 had the lowest mean EV value of 5.4, and the highest number of nitrogen sensitive species (10 species). Habitat parcel 5 had the highest mean EV of 5.91 and the lowest number of nitrogen sensitive species (3 species).

Assessment

Table 6.47 Bridge Woods AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 46.29 DM: 41.75 DS: 43.39
Operation - Ndep increase (max for site) kg N/ha/yr	1.68
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.79
Operation - increase over 0.4 kg N/ha/yr	1.28

Operation - impact extent (ha)	15.98
Operation - impact extent (% of site)	11.8
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites see, PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.26.1 The increase in N deposition (DS-DM) is 1.68kg N/ha/yr. There are five NAA areas of broadleaved deciduous woodland within this AW. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 16.8% of this LCL.
The site investigation did not find any suitable trees on which to undertake a lichen survey, and there was not an existing gradient in the vegetation.
Two nitrophobic AWI with EV4 were recorded: wood anemone and primrose, with one being present in all areas except for Habitat parcel 4. Nitrophilic species were frequently recorded within the field layer of all NAAs including wood avens EV7, wood anemone EV4, dog's mercury EV7 (a species known to respond to increased nitrogen), bluebell (may respond to increased nitrogen in moist soils) and ivy EV7. Indicators of nutrient enrichment, EV8 were present as follows: cleavers (in Habitat parcel 5) and nettle (in Habitat parcels 4 and 5).Some ash dieback was noted in Habitat parcels 2 and 5 and there appeared to be a lack of current coppice management.
Increased N deposition has the potential to cause the loss of nitrogen sensitive species such as wood anemone and primrose and to increase the abundance and distribution of nitrophilic species, such as dog's mercury and bluebell. Ivy, nettle and cleavers could also increase and out-compete the more sensitive species. Considering the species present and that 11.8% of the site is affected, there is potential to affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Therefore, the impact level has been assessed as major adverse and it is considered reasonable to assess the effect as large adverse (significant).

6.27 Bridge Woods, Burham LWS

Baseline

Table 6.48 Bridge Woods, Burham LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	254_AW, 439_LWS
Resource importance:	County
Overlapping site:	Bridge Woods AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	167.36
Site Description - desk study:	The site is designated as Bridge Woods, Burnham LWS and lies to the west of the M2 and A229. The LWS citation describes it as a geomorphologically varied site on the North Downs, comprising a number of wooded dry valleys with chalky slopes, separated by areas of wooded plateau with soils derived from heavy clays and, occasionally, lighter sands. The LWS citation describes the site as formerly managed as coppice with standards, but much of the woodland has been unmanaged for many years, with some sweet chestnut coppicing continuing on parts of the plateau along some of the valley slopes. However, some sweet chestnut Castanea sativa coppicing has continued on parts of the plateau, and some management has been undertaken along some of the valley slopes. The slopes were damaged by the 1987 storm and many trees were uprooted on the west facing slopes. However many of the trees have recovered and there is much fallen live, as well as much dead wood. The plateau woodland forms a mosaic of managed and unmanaged sweet chestnut coppice and mixed coppice with occasional pedunculate and sessile oak standards. Hornbeam, hazel, silver birch, midland and common hawthorn and holly are frequent. The ground flora is dominated by bluebell and bramble, together with wood anemone, wood spurge and wood sorrel. Common dog-violet and wood sage are also present. There are occasional patches of bracken. Where the soils are a little more acidic, creeping soft-grass is found. The slopes are described as being more varied, with hornbeam and hazel on the upper slopes, and ash,

	field maple and hazel more common on the steeper slopes and in the valleys. There are occasional oak standards and a few mature beech. Scattered stands of yew occur along the lower slopes of the valleys, together with whitebeam. A rich and varied shrub layer includes buckthorn, wayfaring-tree, field-rose and dogrose, midland and common hawthorn, guelder-rose and spindle. The ground flora on the base-rich soils is generally dominated by dog's mercury, although many other species occur, including stinking iris, goldilocks buttercup, woodruff, primrose and yellow pimpernel. Where the soils are damp, wood anemone, moschatel and wood speedwell are present. Woodland orchids recorded include fly orchid and lady orchid. The Middlehill Wood area, on the plateau above the go-cart track, is described in the LWS citation as comprising large, open grassy glades, with bugle, primrose, selfheal and yellow pimpernel. The occasional large hornbeam stool, oak standard and large old chestnut remain. According to the LWS citation, Monk Wood has not been surveyed recently but there are records of colonies of lady orchid. The citation notes that a few small areas of the plateau have been converted to conifer plantation. A range of bryophytes is present both on the ground and on the bases of the stools and standard trees, reflecting the variety of soil types in the complex. Over 60 species have been recorded. Lichens are generally very poor, except at the extreme southern end of the complex, where a few ash standards and mature elder support a number of common species. The scarlet cup fungus Sarcoscypha austriaca is found here at the most easterly of only four known sites in the county
Site Condition - As described in citation/by site manager:	The Bridge Woods, Burnham LWS citation (Dec 2011) states that the wood was formerly managed as coppice with standards (sweet chestnut) and that much of the woodland has been unmanaged for years. Some coppicing has been re-instated. From the description, the woodland appears in reasonable condition. The citation states that management has lapsed across most of the site and that small areas have been planted with non-native conifers.
Dates surveyed (2021 and 2022):	9/06/2021, 14/06/2022 and 23/6/2022 and 03/08/2022
Field survey habitat parcel descriptions:	The LWS includes 4 out of the 5 Habitat parcels that comprise Bridge Wood AW, but Habitat parcel 1 is not included to the LWS designation. Habitat parcel 2: A deciduous woodland adjacent to a go-karting track. Sweet chestnut was abundant in the canopy, with occasional ash (with dieback). Bramble was abundant in the understorey, with rare sweet chestnut. Little light reached the woodland floor here as historic coppicing had been neglected. There are some footpath into the woodland from the go karting track, various amounts of litter across woodland.

	Habitat parcel 3: a dense woodland little used by the public, the only track through was a narrow mountain-bike path. Areas to the north of the Habitat parcel had dense ivy cover on the woodland floor. Not a very diverse woodland, with frequent sweet chestnut and ash in the canopy and frequent bramble in the understorey Oak and beech were rare, present as large standards. The field layer had frequent to locally abundant dog's mercury, and abundant bare ground. The ivy cover was dense at the north of the Habitat parcel. Habitat parcel 4: Old sweet chestnut coppice with frequent hornbeam and occasional oak and ash. Understorey sparse but hazel and hawthorn are most frequent. The ground layer is heavily shaded and consists only of the dead flower stems of bluebell over large areas. Six AWIs are present including wood spurge. More open areas are dominated by bramble. Occasional patches of dog's mercury are present in the northern part. A large amount of dead wood is present. Area is used by dog walkers but does not appear to be heavy use. Little sign of management except for one open area of recently coppiced sweet chestnut. Habitat parcel 5: ash dominated woodland with hornbeam and sweet chestnut common within the canopy. Old coppice that appears to be currently unmanaged with a hawthorn understory and bluebell ground flora with much bare ground. Ferns also common. Footpaths within the woodland, heavily shaded.
Lichens:	No suitable trees for lichens
Vegetation gradient:	No vegetation gradients noted on any of the Habitat parcels.
Notes on active management (field survey observations):	Neglected coppice, with footpaths through the site.
Notes on required or beneficial management (field survey observations):	Re-instatement of rotational coppice and creating open space in the woodland.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Some ash die-back noted in Habitat parcels 2 and 5.
Ellenberg values:	Habitat parcel 1 (not part of LWS); Habitat parcel 2: min 4, max 7, mean 5.5; Habitat parcel 3: min 3, max 8, mean 5.53; Habitat parcel 4, min 4 max 8, mean 5.84; Habitat parcel 5, min 4, max 8, mean 5.91
Ellenberg value score 4 and below:	In Bridge Wood LWS a total of 6 species with EV4 were recorded: Habitat parcel 2: EV4: wood anemone, silver birch, wild strawberry, primrose and pedunculate oak. Habitat parcel 3: EV 4: wood anemone, silver birch, primrose, and pedunculate oak. Habitat parcel 4:

	EV4: silver birch and pedunculate oak. Habitat parcel 5: EV4: tufted hair grass, silver birch and wood anemone.
Habitat type (UKHab category):	w1f: Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 2: moderate (score 29) Habitat parcel 3: score 31 (moderate); Habitat parcel 4: score 27 (moderate); Habitat parcel 5 (moderate, score 32)
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Survey of the four Habitat parcels recorded species with every EV between 4 and 8 inclusive. Overall, six potentially nitrogen sensitive species with EV4 were recorded (none with EV less than 4), with five of these six species recorded in Habitat parcel 2. One AWI of EV4 was recorded in all Habitat parcels surveyed: wood anemone, which is a nitrophobe. A species of violet was present in all surveyed Habitat parcels; at it was not in flower it could not be identified, but has potential to be common dog violet, EV4, a nitrophobe and sensitive to nitrogen. Wild strawberry (EV4) was recorded in Habitat parcel 2.

Assessment

Table 6.49 Bridge Woods, Burham LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 57.85 DM: 49.24 DS: 52.72
Operation - Ndep increase (max for site) kg N/ha/yr	3.48
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	34.83
Operation - increase over 0.4 kg N/ha/yr	3.08
Operation - impact extent (ha)	11.41
Operation - impact extent (% of site)	6.82
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.27.1 The increase in N deposition (DS-DM) is 3.48kg N/ha/yr. There are four NAA areas of broadleaved deciduous woodland within this LWS. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 34.8% of this LCL.
The site investigation did not find any suitable trees on which to undertake a lichen survey, and there was not an existing gradient in the vegetation.
One nitrophobic AWI wood anemone (EV4) was recorded in three of the four NAAs. Nitrophilic species were frequently recorded within the field layer of all NAAs including wood avens EV7, wood anemone EV4, dog's mercury EV7 (a species known to respond to increased nitrogen), bluebell (may respond to increased nitrogen in moist soils) and ivy EV7. Indicators of nutrient enrichment, EV8 were present as follows: cleavers (in Habitat parcel 5) and nettle (in Habitat parcels 4 and 5).
Overall, six nitrogen sensitive species with EV4 were recorded (none with EV less than 4).

Some ash dieback was noted in Habitat parcels 2 and 5 and there appeared to be a lack of current coppice management.
Increased N deposition has the potential to cause the loss of nitrogen sensitive species such as wood anemone and to increase the abundance and distribution of nitrophilic species, such as dog's mercury and bluebell. Ivy, nettle and cleavers could also increase and out-compete the more sensitive species. Considering the species present and that 6.8% of the site is affected, there is potential to affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of county value could be either slight or moderate. Given that all of the NAA within the LWS is nationally-important ancient woodland (Bridge Wood AW), the effect is assessed as moderate adverse (significant).

6.28 Broom Hill SINC

Baseline

Table 6.50 Broom Hill SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	384_NIA
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	11.3
Site Description - desk study:	This hilltop site, developed partly on shallow sand/gravel workings, is of interest for its ancient acid-grassland flora.(http://www.essexwtrecords.org.uk/LoWS/Th38)
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed

Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.51 Broom Hill SINC: Assessment

Habitat used for calculation of LCL	Grassland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 21.78 DM: 21.95 DS: 22.56
Operation - Ndep increase (max for site) kg N/ha/yr	0.61
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.08
Operation - increase over 0.4 kg N/ha/yr	0.21
Operation - impact extent (ha)	0.4
Operation - impact extent (% of site)	2.55
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	Not required
Impact level	Moderate adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.28.1 No survey was undertaken in 2022. The citation states that the site is of interest for its acid grassland flora. The APIS website (CEH, 2022) gives a CL range of 10-15kg N/ha/yr for acid grassland (non-Mediterranean dry acid and neutral closed grassland). The increase in N deposition (DS-DM) is 0.61kg N/ha/yr and 6.1% of the LCL for this habitat. The area affected is 0.40ha (2.5% of the site). The NAA may support some species that are sensitive to nitrogen and it is possible that an increase in N deposition could enable the more competitive rank grassland species to expand at the expense of

the more sensitive forb species. Given the lack of survey data and the potential sensitivity of the site, it is precautionary to assume a possible impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse, which results in a slight adverse effect (not significant).

6.29 Buckingham Hill SINC

Baseline

Table 6.52 Buckingham Hill SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	324b_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	22.87
Site Description - desk study:	This site comprises most of the Tarmac sand pit to the east of Buckingham Hill plus a section of grassland to the north in the adjacent golf course. (http://www.essexwtrecords.org.uk/LoWS/Th50)
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.53 Buckingham Hill SINC: Assessment

Habitat used for calculation of LCL	Grassland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.16 DM: 37.39 DS: 39.01
Operation - Ndep increase (max for site) kg N/ha/yr	1.62
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.2
Operation - increase over 0.4 kg N/ha/yr	1.22
Operation - impact extent (ha)	0.58
Operation - impact extent (% of site)	9.67
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Major adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.29.1 No survey was undertaken in 2022. The site is designated for its grassland habitats and a precautionary CL range of 10-15kg N/ha/yr for acid grassland (non-Mediterranean dry acid and neutral closed grassland) has been applied. The increase in N deposition (DS-DM) is 1.62kg N/ha/yr and 16.2% of the LCL for this habitat. The area affected is 0.58ha (9.7% of the site). The NAA may support some species that are sensitive to nitrogen and it is possible that an increase in N deposition could enable the more competitive rank grassland species to expand at the expense of the more sensitive forb species. Given the lack of survey data and the potential sensitivity of the site, it is precautionary to assume a possible impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of county value could be either slight or moderate. Given that the area affected is small and due to the precautionary measures adopted throughout, the effect is assessed as slight adverse (not significant).

6.30 CHADWELL WOOD (AW_Theme_ID 1119923) AW

Baseline

Table 6.54 CHADWELL WOOD (AW_Theme_ID 1119923) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	96_AW
Resource importance:	National
Overlapping site:	Terrels Heath Grays LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.67
Site Description - desk study:	Chadwell Wood is identified on the inventory of Ancient Woodland in England. It lies to the west A1089, approximately 20m from the road at its closest point. Within the NAA, the AW boundary is almost concurrent with The Terrels Heath Grays LWS, but the AW boundary is approximately 5m closer to the road than the LWS boundary. The LWS description states that 'Terrels Heath has a high forest structure dominated by pedunculate oak with some hawthorn, blackthorn, broom and gorse scrub with some invading elm. Despite its ancient status, the ground flora is poor in indicator species and is generally grassy. The wood is used as a recreational area, which has resulted in a network of many paths and consequent disturbance to the flora'.
Site Condition - As described in citation/by site manager:	Terrels Heath LWS description states the following: 'Ancient woods on acid sandy soils are invariably poorer in ancient woodland ground flora than those on damp, neutral soils. However, the flora here is particularly poor, possibly due to decades of heavy recreational pressure and the previous management to the south that has left a very sparse, open canopy. Control of the number of footpaths is desirable but is likely to prove difficult. Some re-stocking with appropriate native trees and shrubs would improve the wildlife value of this site.'
Dates surveyed (2021 and 2022):	17/08/2022

Field survey habitat parcel descriptions:	Habitat parcel 1. Oak woodland with well-spaced abundant oak trees around 30 to 40 cm diameter which looks natural not planted. Occasional wild cherry in the canopy. The understorey has frequent field maple with occasional hawthorn and rare spindle. The field layer is dominated by bramble with frequent ivy, bluebell and garlic mustard. Habitat parcel 2: A mown grassland within open woodland dominated by false oat grass and cocksfoot with abundant common bent and occasional forbs. The grassland was surveyed under drought conditions, so species are likely to have been missed. It is probably cut annually as little sign of woody species or bramble moving in. A path cuts through the site. Some scattered rubbish was observed.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1: no active management observed. Habitat parcel 2: grassland appears to be mown annually.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Reduce bramble cover and plant native trees and shrubs to diversity woodland. Habitat parcel 2: A more varied grass cutting regime would benefit the grassland including cutting at different vegetation heights, more frequent cuts, (at least two, one in early spring and another in late autumn after forb have seeded) to reduce the abundance false oat grass and cocksfoot. Keep some grassland uncut for two years to benefit invertebrates that overwinter in stems. Remove the cuttings to reduce grassland's nutrient status.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: bramble is outcompeting other native woodland flora. The LWS description states recreational pressure has resulted in considerable disturbance to woodland flora. Habitat parcel 2: recreational pressure
Ellenberg values:	Habitat parcel 1: min 4, max 8, mean 6.4. Habitat parcel 2: min 3, max 8, mean 5.
Ellenberg value score 4 and below:	Habitat parcel 1: EV4 pedunculate oak. Habitat parcel 2: Ten species with EV4: yarrow, common bent, soft brome, crested dog's-tail, broom, smaller cat's tail, ribwort plantain, pedunculate oak, common sorrel and ragwort; EV3: sweet vernal grass.
Habitat type (UKHab category):	Habitat parcel 1: w1f - Lowland mixed deciduous woodland. Habitat parcel 2: g3c5 - Arrhenatherum neutral grassland
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland): moderate (score 32). Habitat parcel 2 (grassland): moderate

Limitation(s):	Surveyed in drought conditions
Habitat sensitivity - Area affected by Ndep:	The two different habitats of Chadwell Wood AW are assessed separately as follows: Survey of Habitat parcel 1 (woodland) recorded species with every EV between 4 and 8 inclusive. No AWI species with EV below 4 were recorded, although the AWI, bluebell, EV6, a nitrophile, was frequent in the field layer. Bluebell may respond to increased nitrogen in moist soils (Pitcairn et al., 2006). Other nitrophiles recorded frequently or above were ivy, EV6 and bramble EV6. Bramble is known to respond to increased nitrogen, while the response to nitrogen by ivy is not listed in Pitcairn et al (2006). No nitrophobes were recorded in Habitat parcel 1. No vegetation gradient was evident. Species of EV8 which may be indicative of nutrient enrichment were garlic mustard, EV8 (frequent), cleavers (occasional) and common nettle (occasional). Survey of Habitat parcel 2 (grassland) recorded species with every EV between 3 and 8 inclusive. No AWI species with EV below 4 were recorded, although the AWI, bluebell, EV6, a nitrophile was rare in the grassland. Bluebell may respond to increased nitrogen in moist soils (Pitcairn et al., 2006). The only nitrophile with a DAFOR value of frequent and above was cock's-foot (EV6), which may respond to increased nitrogen (Pitcairn et al., 2006). Sweet vernal-grass (EV 3), a nitrophobe, was frequent in the grassland. No vegetation gradient was observed. The species with the highest EV was garlic mustard (EV8), which was rare in the grassland.

Assessment

Table 6.55 CHADWELL WOOD (AW_Theme_ID 1119923) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 33.1 DM: 33.12 DS: 33.57
Operation - Ndep increase (max for site) kg N/ha/yr	0.45
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.46
Operation - increase over 0.4 kg N/ha/yr	0.05
Operation - impact extent (ha)	0.16
Operation - impact extent (% of site)	9.67
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.30.1 The increase in N deposition (DS-DM) is 0.45kg N/ha/yr. Within the NAA the site supports mixed deciduous woodland and neutral grassland. A precautionary LCL for broadleaved deciduous woodland of 10kg N/ha/yr has been used and the increase in N deposition is 4.5% of this LCL. It is estimated that 9.7% of the 1.67ha site is affected by increased N deposition.

The site investigation did not find any observable vegetation gradient and no lichens on suitable trees were identified. Within the woodland in the NAA no AWIs with an EV below 4 or nitrophobic species were recorded. Frequently recorded nitrophiles included bluebell (EV6, may respond to increased nitrogen in moist soils Pitcairn et al (2006)) and bramble (EV6, known to respond to increased nitrogen Pitcairn et al (2006)). It was noted that there is a lack of management

within the woodland and that bramble is out-competing ground flora.
Within the grassland in the NAA, ten species with an EV4 and one with EV3, sweet vernal grass, a nitrophobe (Pitcairn et al (2006)), were recorded: The grassland is dominated by false oat-grass and cock's foot (EV6, both of which are typical of mesotrophic grasslands and may respond to increased nitrogen Pitcairn et al (2006)).
Recreational pressure was observed within both the grassland and woodland, and this is referred to within Terrels Heath Grays LWS (part of the AW) description as having considerable disturbance to woodland flora.
Additional N deposition may lead to an increase in the growth and range of nitrophilic species, including bluebell and bramble and has the potential to reduce the floristic diversity and lead to the loss of some nitrogen sensitive species. However, the current lack of management is having a similar effect on structure and diversity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible.
Given the absence of sensitive species, the relatively small magnitude in increase in N deposition and that less than 10% of the site is affected by increased N deposition it is unlikely that there will be an adverse effect on the site's integrity.
Therefore, the impact level has been assessed as negligible adverse, resulting in a slight adverse effect (not significant).

6.31 Claylane Wood AW

Baseline

Table 6.56. Claylane Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	228_AW, 229_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	10.21
Site Description - desk study:	This site comprises a stand of woodland adjacent and north of the A2. It is classified in the Ancient Woodland Inventory for England as 'ancient and semi-natural woodland'. Some of the site is to be removed as part of the Project. No citations or descriptions are available.

Site Condition - As described in citation/by site manager:	None available.
Dates surveyed (2021 and 2022):	10/05/2021 and 17/05/2022
Field survey habitat parcel descriptions:	Nearly all the NAA will be lost to the Project. The survey area was therefore part of the retained woodland, adjacent to the west of the NAA. It is dominated by sweet chestnut coppice with occasional hornbeam both as standards and understorey. No trees with a DBH larger than 35-40cm were recorded, with occasional cherry and goat willow, and ash rare. The field layer is typical of ancient woodland with abundant bluebell, frequent wood anemone and locally abundant dog's mercury. Enchanter's nightshade was occasional. This is a plantation on ancient woodland (PAWS), showing signs of being ash/field maple woodland originally.
Lichens:	No suitable trees. No signs of lichens on any of the trees of any species.
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	No apparent active management. Historically planted and coppiced sweet chestnut. Dog walkers frequently encountered. Some localised fire building and mountain biking sites causing erosion. Some areas of bramble encroachment.
Notes on required or beneficial management (field survey observations):	Create glades by felling some of the sweet chestnut coppice to allow light onto the forest floor. Replacement of some sweet chestnuts by native trees and shrubs e.g., hazel and oak. A program of coppice rotation.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Nearly all the NAA lies within the Order Limits, and will therefore be lost. There is adjacent arable farming. In 2018 National Grid were considering options to divert an existing gas pipeline through Claylane Wood to avoid the nearby proposed Project route. The 2022 survey found anthropogenic damage, including a camp fire, a broken tree branch and a cycle jump.
Ellenberg values:	min: 4; max 8; mean 5.91.
Ellenberg value score 4 and below:	EV 4: Wood anemone, silver birch, pedunculate oak, viola sp.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland.
Habitat condition - area affected by Ndep:	Moderate (score 28)
Limitation(s):	N/A

Habitat sensitivity - Area affected by Ndep:	Survey of Claylane AW recorded a mixture of species of high and low EVs. AWI species with an EV of 4 indicating a sensitivity to nitrogen included wood anemone and a species of violet. The most common nitrophiles in the field layer were brambles (EV 6) which is known to respond to increased nitrogen, and ivy (EV 6). No gradient was evident, and species indicative of nutrient enrichment (e.g., common nettle and cleavers) were rare. The field layer includes the nitrophile bluebell which was abundant. Four species with EV 8 were recorded, garlic mustard, cleavers, hedge woundwort and common nettle.

Assessment

Table 6.57 Claylane Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.61 DM: 42.26 DS: 43.79
Operation - Ndep increase (max for site) kg N/ha/yr	1.53
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	15.27
Operation - increase over 0.4 kg N/ha/yr	1.13

Operation - impact extent (ha)	4.21
Operation - impact extent (% of site)	41.24
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.31.1 The increase in N deposition (DS-DM) is 1.53kg N/ha/yr, which is 15.3% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. It is estimated that 4.21ha (41.2%) of this 10.21ha site is affected by increased N deposition (the NAA). However, 4.6ha of this site is to be removed as part of the Project, of which 3.77ha is within the NAA. As a result, the remaining 0.44ha of NAA represents only 7.84% of the remaining site area of 5.61ha.

The site investigation was undertaken within the area of retained vegetation and recorded species sensitive to nitrogen, including wood anemone and a species of violet. The most common nitrophile in the field layer was bramble (EV 6) which is known to respond to increased nitrogen, and ivy (EV 6). Bluebell and dog's-mercury, which are typical woodland species that are likely to increase in response to increased N (Pitcairn et al 2006) were abundant and species of EV8, which are indicative of fertile conditions were also present, including garlic mustard, cleavers, hedge woundwort and nettle. There was no observable vegetation gradient and no lichens on suitable trees were identified.

Given the current vegetation composition, the small size of the remaining area of the site affected by increased N deposition, and that the direct loss of habitat is of far more consequence to the integrity of the site than an increase in N deposition, the impact level of increased N deposition is assessed to be negligible adverse, which results in a slight adverse effect (not significant).

6.32 Cobham Woods SSSI

Baseline

Table 6.58 Cobham Woods SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	240_SSSI_AW
Resource importance:	National
Overlapping site:	Great Wood AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	242.75
Site Description - desk study:	Cobham Woods SSSI is a large site (243ha) which encompasses most of Great Wood AW. Most of the SSSI is within Ranscombe Farm reserve. The SSSI citation describes the site as comprising woodland and old parkland representative of woods in North Kent. The woodland is largely sweet chestnut coppice with some conifer plantations, while the parkland is now mature woodland, with some clearings, of oak, sweet chestnut, beech, hornbeam, and other species. The notified habitats of the site comprise the National Vegetation Classification woodland types W8 and W10. The site is also notified for populations of the vascular plants broadleaved cudweed *Filago pyramidata*, ground pine *Ajuga chamaepitys*, hairy mallow *Althaea hirsuta* and meadow clary *Salvia pratensis*. The SSSI citation describes these species as present around an area of arable land. The site is well known for its large number of beetle species and its good variety of typical woodland bird species.
Site Condition - As described in citation/by site manager:	The area of the SSSI closest to the ARN and potentially affected by N deposition is Unit 4 (Great Wood AW). This unit is adjacent to and overlaps with the M2 motorway and is bisected by the HS1 railway (approximately 100-130m wooded width between motorway and railway). SSSI unit 4 (64.64ha) was assessed as 'favourable' condition in May 2013, with the following comment: Woodland structure and natural processes are within target.

	Woodland has good canopy cover, understorey, open space, dead wood, regeneration and areas of minimum intervention. Species composition is within target, with native species of trees, scrub and ground flora. However it is unknown what is defined by 'on target' or whether this description applies to the NAA lying to the east of HS1, or to that part of Unit 4 lying to the west of HS1.
Dates surveyed (2021 and 2022):	5/5/2021 and 15/6/2022
Field survey habitat parcel descriptions:	Abundant old sweet chestnut coppice, slightly more recent on the west of the NAA but very similar. Bramble abundant in the field flora with AWI present. Hornbeam frequent in the canopy with occasional hazel and hawthorn in the understorey.
Lichens:	No suitable trees for lichens
Vegetation gradient:	No visible gradient
Notes on active management (field survey observations):	No active management. Abundant old sweet chestnut coppice
Notes on required or beneficial management (field survey observations):	Rotational coppice required to open up the ground layer to light.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2021 site investigation identified recreational use as a potential threat / pressure. Recreational use by the members of the public from Strood reaching the site via an underpass under the M2.
Ellenberg values:	min 3, max 8, mean 5.56.
Ellenberg value score 4 and below:	Silver birch 4; wild strawberry 4; creeping soft grass 3; bracken 3; pedunculate oak 4; primrose 4; butcher's broom 4
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	Moderate (score 26)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA. Given the survey covered similar habitat, this is not considered a significant limitation.
Habitat sensitivity - Area affected by Ndep:	Survey of Cobham Wood SSSI recorded species with every EV between 3 and 8 inclusive. The most abundant species in the understorey was bramble (EV 6), which is a nitrophile,

	known to respond to increased nitrogen. Creeping soft-grass (AWI and EV3) was rare in the field layer, but is categorised as a nitrophile and could increase in response to increased N (Pitcairn et al. 2006). Other AWI species with EV4, which could be sensitive to nitrogen included wild strawberry, primrose and butcher's broom. Bluebell, which may respond to nitrogen in moist soils, was rare. No gradient was visible. Common nettle (EV 8), which is indicative of nutrient enrichment, was occasional.

Assessment

Table 6.59 Cobham Woods SSSI: Assessment

Habitat used for calculation of LCL	Meso- and eutrophic Quercus woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	15
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 62.14 DM: 56.94 DS: 62.09
Operation - Ndep increase (max for site) kg N/ha/yr	5.16
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	34.37
Operation - increase over 0.4 kg N/ha/yr	4.76
Operation - impact extent (ha)	14.54

Operation - impact extent (% of site)	5.99
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.32.1 The increase in N deposition (DS-DM) is 5.16kg N/ha/yr. The site-relevant CL range provided on APIS (CEH, 2022) is 15-20kg N/ha/yr for meso- and eutrophic Quercus woodland and the increase in N deposition is 34.4% of this LCL. The DS N deposition is more than triple the upper critical load for this habitat at 62.09kg N/ha/yr. The site investigation did not record any existing gradient in the vegetation or an abundance of species indicative of nutrient enrichment, despite proximity to the existing motorway. There are nitrogen-sensitive AWI species in the NAA (e.g., wild strawberry, primrose and butcher's-broom) that are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. There is other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as nettle are currently infrequent but could increase in cover as a result of increased N deposition. The area of the site affected (14.54ha) is 6% of the area of SSSI designation. The SSSI (unit 4) is already fragmented by the HS1 railway and part of the area mapped as designated SSSI overlaps with the M2 motorway and with the railway (and is therefore counted within both the area of designation and in the area affected by N deposition but does not support woodland). The area of overlap is estimated at 4.63ha, which reduces the area of woodland habitat within the NAA to 9.91ha and to 238.12ha in the SSSI, meaning that the percentage of the woodland habitat in the SSSI that is affected by increased N deposition is reduced to an estimated 4.16%.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in this part of the site could change, causing a possible effect on site integrity. Therefore, the impact level has been assessed as major. The effect of a major impact level on a site of national value could be either large or very large. Given that this site is already fragmented by the HS1

railway and the precautionary measures adopted throughout the assessment, the resulting effect is assessed as large adverse (significant).

6.33 Codham Hall Wood AW

Baseline

Table 6.60 Codham Hall Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	78_LWS_AW
Resource importance:	National
Overlapping site:	Codham Hall Woods LWS
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	5.12
Site Description - desk study:	The site is an AW lying to the north-east of J29 of the M25, between the M25 and the A127, grid reference TQ585 890. The AW is also part of Codham Hall Woods LWS. The LWS description describes the AW as comprising broadleaved woodland dominated by densely shading hornbeam coppice with occasional pedunculate oak standards. Sweet chestnut is found as a locally dominant tree species, whilst sycamore and silver birch are also present. Elder is part of a very sparse shrub layer. Bluebell and wood anemone are abundant throughout the ground flora, which also has other ancient woodland indicator species, including yellow archangel, wood millet, wood-sedge and pendulous sedge.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	26/05/2022
Field survey habitat parcel descriptions:	Woodland canopy with abundant hornbeam with occasional silver birch, field maple and pedunculate oak. Open understorey, with frequent hawthorn, and occasional yew and sweet

	chestnut. Field layer with frequent to locally abundant bramble. The field layer was relatively diverse, with frequent bluebell, wood anemometer, cleavers, nettle, rough meadow grass, ground ivy, wood millet and honeysuckle.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No evidence of a vegetation gradient. Boundary with the highways land tends to be grassier which is likely due to greater light levels.
Notes on active management (field survey observations):	No management evident. Canopy dominated by spindly hornbeam casting a heavy shade over the field layer.
Notes on required or beneficial management (field survey observations):	Thinning and/or coppicing of the hornbeam on rotation would be beneficial to increase light levels reaching the ground layer, to allow other tree species to establish and develop greater structural diversity within the woodland
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	A public footpath running along Codham Wood Halls eastern and northern borders, so public access could disturb the woodland. Lack of management, with canopy casting dense shade.
Ellenberg values:	min 4, max 8, mean 5.66.
Ellenberg value score 4 and below:	Species with EV4: wood anemone, silver birch, broom, hedge bedstraw, soft rush, pedunculate oak and common ragwort. No species were recorded with EV less than 4.
Habitat type (UKHab category):	w1f; lowland mixed deciduous woodland.
Habitat condition - area affected by Ndep:	Moderate (29 points)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of Codham Hall Wood recorded species with every EV between 4 and 8 inclusive. One AWI was recorded, wood anemone (EV 4) indicating potential sensitivity to nitrogen. This species is a nitrophobe (Pitcairn et al., 2006) and was frequent in the field layer. With the exception of honeysuckle, all the other species that were recorded as frequent in the field layer were nitrophiles, and included the following: bluebell, cleavers, rough meadow grass, brambles, ground ivy and wood millet. Bluebell (EV 6), may respond to increased nitrogen in moist soils, cleavers (EV8), is an indicator or nutrient enrichment, rough meadow-grass (EV6), wood millet (EV 5) and bramble (EV6) are known to respond to increased nitrogen and ground ivy (EV7) can spread rapidly with increased N deposition. Species

	indicative of nutrient enrichment, nettles and cleavers, were frequent throughout. Two other nitrophiles were present in the field layer, herb Robert EV7 (occasional) and cock's-foot (occasional). Herb Robert is known to respond to increased nitrogen and cock's-foot may respond to increased nitrogen Pitcairn et al (2006).

Assessment

Table 6.61 Codham Hall Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.94 DM: 44.71 DS: 45.15
Construction – impact extent (ha)	2.82
Construction - years where impact exceeds 0.4 kg N/ha/yr	2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.98 DM: 43.32 DS: 44.51
Operation - Ndep increase (max for site) kg N/ha/yr	1.2
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	11.98
Operation - increase over 0.4 kg N/ha/yr	0.8
Operation - impact extent (ha)	4.91
Operation - impact extent (% of site)	95.94

Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.33.1 The AW overlaps with Codham Hall Wood LWS.
During construction, the site is predicted to be affected for one year only (2028), when the maximum increase in N deposition (DS-DM) is expected to be 0.44kg N/ha/yr (4.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr). The extent of the NAA is estimated to be 2.8ha (55% of the site).
During operation, the increase in N deposition (DS-DM) is 1.20kg N/ha/yr and 12% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. It is estimated that 95.9% of the site is affected by increased N deposition (the NAA). There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but makes no difference to the outcome of the assessment of effects of increased N deposition.
Most of the species recorded during the detailed site investigation are nitrophiles typical of fertile woodland soils, such as bluebell, cleavers, rough meadow-grass, bramble, ground ivy and wood millet. The only species that appears to be nitrogen sensitive is wood anemone, with an EV of 4 and there is a risk that this species could be out-competed by species more responsive to increased N deposition. No vegetation gradient was evident with common nettle and cleavers, both indicative of nutrient enrichment, frequent throughout. The existing dominance of species such as bramble and bluebell suggest there is unlikely to be a significant change in vegetation composition. However, given that approximately 96% of this site is predicted to be affected by increased N deposition, it is precautionary to assume there could be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. The one year of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.
Therefore, the overall impact level has been assessed as major adverse. The effect of a major adverse impact level on a site of national value could be either large or very large. Given that there is unlikely to be a significant change in

vegetation composition and due to the precautionary measures adopted throughout the assessment, the effect is assessed as large adverse.

6.34 Codham Hall Woods LWS

Baseline

Table 6.62 Codham Hall Woods LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	381_LWS, 78_LWS_AW
Resource importance:	County
Overlapping site:	Codham Hall Wood AW
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	7.88
Site Description - desk study:	The site designated as a LWS includes Codham Hall Wood AW. The LWS is larger than the AW, extending beyond the AW at its north-east corner, but as this area is further than 200m from the ARN, that section of the description is not included here. A small area of the LWS also extends beyond the AW to the south. The LWS citation describes the AW as comprising broadleaved woodland dominated by densely shading hornbeam coppice with occasional pedunculate oak standards. Sweet chestnut is found as a locally dominant tree species, whilst sycamore and silver birch are also present. Elder is part of a very sparse shrub layer. Bluebell and wood anemone are abundant throughout the ground flora, which also has other ancient woodland indicator species, including yellow archangel, wood millet, wood-sedge and pendulous sedge.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	26/05/2022

Field survey habitat parcel descriptions:	Woodland canopy with abundant hornbeam with occasional silver birch, field maple and pedunculate oak. Open understorey, with frequent hawthorn, and occasional yew and sweet chestnut. Field layer with frequent to locally abundant bramble. The field layer was relatively diverse, with frequent bluebell, wood anemone, cleavers, nettle, rough meadow grass, ground ivy, wood millet and honeysuckle.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No evidence of a vegetation gradient. Boundary with the highways land tends to be grassier which is likely due to greater light levels.
Notes on active management (field survey observations):	No management evident. Canopy dominated by quite spindly hornbeam casting a heavy shade over the field layer.
Notes on required or beneficial management (field survey observations):	Thinning and/or coppicing of the hornbeam on rotation would be beneficial to increase light levels reaching the ground layer, to allow other tree species to establish and develop greater structural diversity within the woodland
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	A public footpath running along Codham Wood Halls eastern and northern borders, so public access could disturb the woodland. Lack of management, with canopy casting dense shade.
Ellenberg values:	min 4, max 8, mean 5.66.
Ellenberg value score 4 and below:	Species with EV4: wood anemone, silver birch, broom, hedge bedstraw, soft rush, pedunculate oak and common ragwort. No species were recorded with EV less than 4.
Habitat type (UKHab category):	w1f; lowland mixed deciduous woodland.
Habitat condition - area affected by Ndep:	Moderate (29 points)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of Codham Hall Wood recorded species with every EV between 4 and 8 inclusive. One AWI was recorded, wood anemone (EV 4) indicating potential sensitivity to nitrogen. This species is a nitrophobe (Pitcairn et al., 2006) and was frequent in the field layer. With the exception of honeysuckle, all the other species that were recorded as frequent in the field layer were nitrophiles, and included the following: bluebell, cleavers, rough meadow grass, brambles, ground ivy and wood millet. Bluebell (EV 6) may respond to increased nitrogen in moist soils, cleavers (EV8), is an indicator or nutrient enrichment, rough meadow-

	grass (EV6), wood millet (EV 5) and bramble (EV6) are known to respond to increased nitrogen and ground ivy (EV7) can spread rapidly with increased N deposition. Species indicative of nutrient enrichment, nettles and cleavers, were frequent throughout. Two other nitrophiles were present in the field layer, herb Robert EV7 (occasional) and cock's-foot (occasional). Herb Robert is known to respond to increased nitrogen and cock's-foot may respond to increased nitrogen Pitcairn et al (2006).

Assessment

Table 6.63 Codham Hall Woods LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.94 DM: 44.71 DS: 45.15
Construction – impact extent (ha)	2.80
Construction - years where impact exceeds 0.4 kg N/ha/yr	2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.98 DM: 44.23 DS: 45.2
Operation - Ndep increase (max for site) kg N/ha/yr	1.2
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	11.98

Operation - increase over 0.4 kg N/ha/yr	0.8
Operation - impact extent (ha)	4.93
Operation - impact extent (% of site)	62.54
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.34.1 Most of the NAA in Codham Hall Wood is within the AW block, but a small area of the LWS extends beyond the AW to the south and this is also affected by increased N deposition during both construction and operation. The habitat in this part of the LWS is also broadleaved deciduous woodland.

During construction, the site is predicted to be affected for one year only (2028), when the maximum increase in N deposition (DS-DM) is expected to be 0.44kg N/ha/yr (4.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr). The extent of the NAA is estimated to be 2.8ha (36% of the site).

During operation, the increase in N deposition is 1.20kg N/ha/yr and 12% of the LCL. The LWS is larger than the AW block and it is estimated that 62.5% of the LWS is affected by increased N deposition (the NAA). There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but makes no difference to the outcome of the assessment of effects of increased N deposition.

Most of the species recorded during the detailed site investigation are nitrophiles typical of fertile woodland soils, such as bluebell, cleavers, rough meadow-grass, bramble, ground ivy and wood millet. The only species that appears to be nitrogen sensitive is wood anemone, with an EV of 4 and there is a risk that this species could be out-competed by species more responsive to increased N deposition. No vegetation gradient was evident with common nettle and

cleavers, both indicative of nutrient enrichment, frequent throughout. The existing dominance of species such as bramble and bluebell suggests there is unlikely to be a significant change in vegetation composition. However, given that nearly two thirds of the LWS is predicted to be affected by increased N deposition during operation, it is assumed that there could be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. The one year of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.

Therefore, the overall impact level has been assessed as major adverse. The effect of a major impact level on a site of county importance could be either slight or moderate. However, given that most of the LWS is within a nationally-important AW and the assessment of the AW concludes a significant effect, it is appropriate to assess the effect on the LWS as moderate adverse (significant).

6.35 CONEYEARTH_PASCALLS_HOLLOWS WOODS (AW_Theme_ID 1499437) AW

Baseline

Table 6.64 CONEYEARTH_PASCALLS_HOLLOWS WOODS (AW_Theme_ID 1499437) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	116_AW, 117_AW, 32_LWS_AW
Resource importance:	National
Overlapping site:	Woodlands West of Shoreham LWS
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	37.88
Site Description - desk study:	This AW is within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS.
Site Condition - As described in citation/by site manager:	Unknown

Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.65 CONEYEARTH_PASCALLS_HOLLOWS WOODS (AW_Theme_ID 1499437) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 42.85 DM: 42.36 DS: 43.09
Operation - Ndep increase (max for site) kg N/ha/yr	0.74
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	7.35
Operation - increase over 0.4 kg N/ha/yr	0.34
Operation - impact extent (ha)	0.45
Operation - impact extent (% of site)	1.2
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.35.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.74kg N/ha/yr. A review of aerial imagery suggests that the NAA supports broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 7.4% of this LCL. This AW is part of a larger area within Woodlands West of Shoreham LWS. The site description for the LWS indicates that there is a rich and varied ground flora and over 50 species of AWI are present within the woodlands of the LWS. The area affected is 1.2% of the AW and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible. Given the small area affected, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.36 Copped Hall Green LWS

Baseline

Table 6.66 Copped Hall Green LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	500_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	21.4

Site Description - desk study:	The site is designated as Copped Hall Green LWS. The site citation describes it as comprising of a large mosaic of woodland, plantation, grassland and ponds, including Copped Hall Green itself, woods and grassland near Copped Hall Green and other woods close to Lodge and Nichols Farms. The woodland mainly comprises pedunculate oak and ash standards with some hornbeam and field maple coppice and an understorey of hawthorn and blackthorn. Bramble is locally dominant over a species-poor ground flora with frequent common nettle. There is a large amount of dead wood habitat on the woodland floor. The woodland is not included in the inventory of Ancient Woodland for England. The grassland is generally characterised by neutral soil species, with some damper areas supporting meadowsweet and rushes. Coarse grasses such as false oatgrass and Yorkshire-fog are dominant. Sneezewort has been recorded.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A

Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.67 Copped Hall Green LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 57.14 DM: 55.45 DS: 55.96
Operation - Ndep increase (max for site) kg N/ha/yr	0.51
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.11

Operation - increase over 0.4 kg N/ha/yr	0.11
Operation - impact extent (ha)	0.05
Operation - impact extent (% of site)	0.25
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.36.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.51kg N/ha/yr. The site is directly adjacent to the M25 and the NAA extends less than 10m into the site from the northern edge of the M25. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland and grassland habitats. The more precautionary LCL is 10kg N/ha/yr for deciduous broadleaved woodland and the increase in N deposition is 5.1% of this LCL. The LWS citation describes the site as a large mosaic of woodland, plantation, grassland and ponds. In the woodland, bramble is locally dominant over a species-poor ground flora with frequent common nettle. The grassland is generally characterised by neutral soil species, with coarse grasses such as false oat-grass and Yorkshire-fog dominant. The area affected is 0.05% of the LWS and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible. Given the very small area affected, it is unlikely that an increase in N deposition could affect the integrity of the site.
The effect of a negligible adverse impact level on a site of county value could be either neutral or slight. Given the very small NAA and the precautionary measure adopted throughout the assessment, this is considered to result in a neutral effect (not significant).

6.37 Court Wood, Shorne LWS

Baseline

Table 6.68 Court Wood, Shorne LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	367_LWS_AW
Resource importance:	County
Overlapping site:	Peartree Wood AW
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	45.17
Site Description - desk study:	Court Wood, Shorne LWS (NGR: TQ70487130) overlaps with Peartree Wood AW, but the boundary of the latter is closer (directly adjacent) to the ARN. The part of the LWS within the NAA is ancient replanted wood (ARW), although the LWS includes blocks of AW beyond the NAA. The LWS description describes the site as being semi-natural broadleaved woodland on a range of soil types, which has largely been converted to sweet chestnut but still retains a good diversity of woodland ground flora, including 38 ancient woodland indicator species. The woodland complex is situated mainly on high ground but is dissected by a north/south valley and is generally undulating. On the higher, acid to neutral soils, the woodland consists of actively-managed sweet chestnut coppice with occasional sessile oak standards. Fine relict hornbeam coppice is present along some of the edges and sporadically within the chestnut. In Starmore Wood the coppice is more mixed. ash, hazel and field maple coppice stools occur occasionally and are dominant in the valley and on the lower ground on the chalk in the north. The ground flora is reasonably diverse, although bluebell, wood anemone and bramble dominate. Great wood-rush and bitter vetch have been recorded on the more acid soils. Common woodland plants such as early-purple orchid, sanicle, primrose, nettle-leaved bellflower and moschatel are found with dog's mercury on the base-rich soils at the northern end. A small stream bordered by pendulous sedge and supporting common aquatic species runs through a narrow block of ancient woodland and chalk and elm scrub in

	the north. The bryophyte flora is diverse and reflects the different soil types. Over 40 species have been recorded. An area of unmanaged grassland and scrub, including a derelict orchard, to the east of the village of Shorne (at approximately TQ 695713) has been added to the LWS and is further than 200m from the ARN. A further extension to the LWS, lying approximately 730m from the NAA, at TQ 698707, comprises unmanaged semi-improved neutral grassland of limited botanical interest, but this sheltered area complements the adjacent woodland.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	18/11/2021 and 23/06/2022
Field survey habitat parcel descriptions:	Habitat parcel 1: The woodland has an area of hazel coppice with AWIs beneath. The remainder of the woodland is sweet chestnut coppice circa 15 years old, growing from mature stools. The plot includes three mature oaks and a semi-mature ash. The woodland is open and bramble does not dominate the field layer allowing AWIs to grow. A total of five AWI species were recorded, including frequent bluebell an occasional wood spurge. There was significant leaf litter. Habitat parcel 2: Woodland canopy of abundant young sweet chestnut coppice approximately thirty years old, with rare pedunculate oak. The understorey comprised occasional hazel and dogwood, with rare native woodland shrubs, including spindle, crab apple, hawthorn, hornbeam and holly. The field layer had abundant bramble where few AWI could grow. The woodland had a network of narrow dirt tracks kept open by small vehicles used to transport wood. The tracks are open bramble free glades allowing thirteen AWIs to flourish, including frequent bluebell, wood sedge, wood anemone and wood melick.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1: No active management. Habitat parcel 2: Some coppicing of sweet chestnut for timber extraction, wood storage. Wayleave, 50x10m mown for overhead cables. Bird boxes present.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: re-instate coppicing of sweet chestnut and hazel and install bird boxes. Remove rubble and rubbish. Habitat parcel 2: more coppicing required, and bramble control. Replace sweet chestnut with native species such as hornbeam.

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcels 1 and 2: lack of management. The young, even age, sweet chestnut coppice and lack of understorey shrubs provide limited sheltered nesting locations for birds or refuges for small mammals. Up to 20% of Habitat parcel 1 is impacted by storage of building and other materials.
Ellenberg values:	Habitat parcel 1: min 4, max, 7, mean 5.68 Habitat parcel 2: min 3, max 8, mean 5.4
Ellenberg value score 4 and below:	Habitat parcel 1: EV4: wood anemone and pedunculate oak. Habitat parcel 2: EV4: wood anemone, marsh thistle, wild strawberry, soft rush, primrose, self-heal, pedunculate oak. EV3: creeping soft-grass and slender St John's wort.
Habitat type (UKHab category):	w1f7 - other lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1: moderate (score 28); Habitat parcel 2: moderate (score 27)
Limitation(s):	The 2022 survey was carried out over a larger NAA than required, because the pre-June 2022 NAA extended approximately 200m from the road whereas the June 2022 NAA extended only approximately 45m from the road.
Habitat sensitivity - Area affected by Ndep:	Survey of the two Habitat parcels recorded species with every EV between 2 and 8 inclusive. Overall, nine species of EV4 or less were recorded, seven species with EV4 and two species with EV3. Two nitrophobe species of AWI (EV4) were recorded: wood anemone (transects 1 and 2) and primrose (transect 2). Two AWI of EV 3 were recorded, creeping soft grass (which is a nitrophile) and slender St John's wort (both in transect 2). Wild strawberry, EV4, was recorded in transect 2, but is not an AWI in Kent. Bramble (EV 6) was frequent in Habitat parcel 1 and abundant in Habitat parcel 2. Bramble is a nitrophile and known to respond to increased nitrogen (Pitcairn et al (2006)). The following nitrophiles were frequent in both transects: bluebell EV6 (may respond to increased nitrogen) and ivy EV6. Dog's mercury, a nitrophile of EV7, was recorded at low cover in the quadrat in Habitat parcel 1 and was occasional in Habitat parcel 2. No indicators of nutrient enrichment were present in Habitat parcel 1, and the species with the highest EV (8) in Habitat parcel 2 was garlic mustard. Rough meadow-grass, a nitrophile of EV6, was recorded at low cover in the quadrat of Habitat parcel 1, but nowhere else. This species is known to respond to increased nitrogen (Pitcairn et al., 2006). Of the two transects at this site, transect 2 had the lowest mean EV value of 5.4 and transect 1 had the highest mean EV value of 5.68. Transect 2 had the highest number of potentially nitrogen sensitive species (nine) species and Transect 1 had two.

Assessment

Table 6.69 Court Wood, Shorne LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 35.73 DM: 34.75 DS: 35.38
Construction – impact extent (ha)	0.65
Construction - years where impact exceeds 0.4 kg N/ha/yr	2027, 2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 35.86 DM: 34.28 DS: 34.79
Operation - Ndep increase (max for site) kg N/ha/yr	0.51
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.1
Operation - increase over 0.4 kg N/ha/yr	0.11
Operation - impact extent (ha)	1.63
Operation - impact extent (% of site)	3.62
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	Not required

Impact level	Moderate adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.37.1 Court Wood, Shorne LWS overlaps with Peartree Wood AW, but the boundary of the latter is closer (directly adjacent) to the ARN. The modelled N deposition figures are different for the two sites as two different transect locations were modelled.

During construction, the site is predicted to be affected for two years (2027 and 2028), when the maximum increase in N deposition (DS-DM) is expected to be 0.77kg N/ha/yr (7.74% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr). The extent of the NAA is estimated to be 0.65ha (1% of the site).

During operation, the increase in N deposition (DS-DM) is 0.51kg N/ha/yr, which is 5.1% of the LCL for broadleaved deciduous woodland of 10kg N /ha/yr.

The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation but noted leaf litter in the north of the site along with storage of building and other materials which is likely to be impacting upon the success of AWI growth in this area.

Potential nitrogen-sensitive AWI ground flora species within the NAA include wood anemone and primrose (EV4), both noted as nitrophobes in Pitcairn et al. (2006) and slender St John's wort (EV3). Creeping soft grass (EV3) was also recorded, but this species is noted to increase in response to N deposition (Pitcairn et al. 2006). Although nitrogen sensitive AWI are persisting in current high levels of nitrogen deposition, further increases in N deposition may put these species at risk of loss from the NAA. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble, the latter already recorded as frequent and abundant in transects 1 and 2 respectively.

The NAA during operation extends approximately 45m into the wood and it is predicted that approximately 3.6% of this site will be affected by increased N deposition.

There is a risk that the nitrogen sensitive species in the ground flora could be out-competed by species such as bluebell, dog's-mercury and bramble and therefore become less abundant or lost from the NAA. Loss of these characteristic species has potential to have an impact on site integrity.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible. The two years of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.

Therefore, the impact level has been assessed as moderate adverse, which results in a slight adverse effect (not significant).

6.38 Curtis Plantation SINC

Baseline

Table 6.70 Curtis Plantation SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	625_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.0
Site Description - desk study:	Curtis Plantation is marked in the Havering Local Plan as a site of special borough wide importance for biodiversity and geodiversity. Evidence of illegal felling of protected trees within the site was reported by a local newspaper in 2019. Aerial imagery shows visible gaps in the canopy and bare ground. There is hardstanding and buildings within the boundary of the SINC.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.71 Curtis Plantation SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.16 DM: 43.65 DS: 44.34
Operation - Ndep increase (max for site) kg N/ha/yr	0.69
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.94
Operation - increase over 0.4 kg N/ha/yr	0.29
Operation - impact extent (ha)	0.57
Operation - impact extent (% of site)	28.31
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Moderate adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.38.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.69kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 6.9% of this LCL.
Aerial imagery shows that the current SINC boundary includes an area of hardstanding and buildings, comprising approximately 40% of the total SINC. Therefore, the impact extent figure and percentage of the site affected would be reduced, if the SINC boundary was amended to exclude the built-on area.
The area affected is currently given at 28.3% of the site (but would be reduced if SINC boundary corrected) and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible.
Considering the relatively small increase in N deposition, area affected and the precautionary approach applied in the absence of site survey data, it is considered that an increase in N deposition has the potential to affect the integrity of the

site.
Therefore, the impact level has been assessed as moderate adverse which results in a slight adverse effect (not significant).

6.39 Cuxton Pit No. 3, Strood LWS

Baseline

Table 6.72 Cuxton Pit No. 3, Strood LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	241_LWS, 774_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	6.93
Site Description - desk study:	Cuxton No 3 Pit LWS was first notified in March 1995. Following the construction of a housing estate over much of the site, its boundary was re-drawn around the remaining semi-natural habitats of a very large chalk pit. The site description is as follows: 'this site comprises the woodland edge, the steep vertical quarry sides and a small part of the floor of the pit. The small area remaining of the floor of the chalk pit is a mosaic of birch *Betula pendula* and willow *Salix* sp. scrub, with an area of shallow standing water and damp willow carr. The slope down to this area from the housing estate is in the early stages of colonisation by pioneer species. The shallow pool at TQ720678 supports a range of damp-loving species such as brookweed (*Samolus valerandi*), a local Kentish species, as well as gipsywort (*Lycopus europaeus*), purple-loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*) and sea club-rush (*Bolboschoenus maritimus*). Common-spotted orchid (*Dactylorhiza fuchsii*) is present in damp soil near the pool. Under the sallows in one area a large population of round-leaved wintergreen (*Pyrola rotundifolia*) was recorded in the past and may still be present in the seed bank. The scrub is dominated by sallow (*Salix cinerea subsp. oleifolia*) and goat willow (*Salix caprea*) with

	much buddleja (*Buddleja davidii*) and bramble (*Rubus fruticosus agg.*). Species characteristic of the chalk such as traveller's-joy (*Clematis vitalba*), dogwood (*Cornus sanguinea*) and wayfaring-tree (*Viburnum lantana*) occur and ash (*Fraxinus excelsior*) is seeding in. The slope down to the pool, recently disturbed at the time of the survey has been colonized by chalk-loving ruderal species and few of the more vigorous grassland species such as marjoram (*Origanum vulgare*) and common bird's-foot-trefoil (*Lotus corniculatus*). A scrub dominated shelf with thin soils, part of the original quarry face, has a relict chalk flora including pyramidal orchid (*Anacamptis pyramidalis*) and mouse-ear hawkweed (*Pilosella officinarum*). The cliffs and rim are being colonised in some places by chalk scrub and secondary woodland, with much buddleia, hawthorn (*Crataegus monogyna*), spindle (*Euonymus europaeus*) and field maple (*Acer campestre*) occurring. Elsewhere, the cliffs are bare, with small ledges being colonised by red valerian (*Centranthus ruber*). At the top of the cliffs on the north-west side of the site, woodland shown on the ancient woodland inventory is present.
Site Condition - As described in citation/by site manager:	The LWS description (Dec 2011) states that the chalk floor pit is becoming dominated by pioneer species such as birch and willow but provides no further details.
Dates surveyed (2021 and 2022):	14/07/22
Field survey habitat parcel descriptions:	The 2022 survey of the accessible area of the chalk pit floor is as follows: This was a habitat mosaic on previously developed land. Very dense impenetrable scrub. The woodland component had frequent young silver birch and occasional willows and Italian alder. The scrub, over bare chalky ground, is dominated by cotoneaster, with frequent wayfaring tree and buddleia and occasional dogwood. Other habitats present included bare ground and ephemeral/short perennial vegetation. There were small areas of calcareous grassland which are being encroached by scrub, especially wall cotoneaster. Mouse ear hawkweed is abundant in the ground layer, with frequent bird's foot trefoil and occasional calcareous indicators such as kidney vetch, yellowwort, milkwort and rough hawkbit.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Large balancing pond with an exposed liner with inflow from the adjacent housing estate. Largely dry but with two areas of shallow standing water, one at each end supporting bulrush, club rush, great willowherb and purple loosestrife. Surrounding area is completely unmanaged with patches of calcareous ephemeral/short perennial habitat rapidly succeeding to scrub and woodland. Cotoneaster and buddleia are particularly widespread.

Notes on required or beneficial management (field survey observations):	Control of encroaching scrub especially invasives to enable the development of calcareous grassland over at least some of the site and native woodland and scrub elsewhere. Create more bare ground for invertebrates. Remove the plastic liner of the balancing pond, which could be done without impacting either of the two ponds present.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey found historic newt fencing scattered throughout the site which should have been removed. Lack of management is the main threat to this LWS.
Ellenberg values:	Habitat mosaic: min 2, max 8 and mean 4.97 Ponds (x2): min 5, max, mean 6.45
Ellenberg value score 4 and below:	A total of 21 species with EV 4 or less were recorded (ten species of EV4, six species of EV3 and five species of EV 2) as follows. Species with EV 4: yarrow, silver birch, wall cotoneaster (an INNS), wild strawberry, black medick, marjoram, self-heal, pedunculate oak, ragwort, and rowan. Species with EV 3: common centaury, common spotted orchid, broadleaved everlasting pea, rough hawkbit, common milkwort and salad burnet. Species with EV2: kidney vetch, yellow wort, fairy flax, common bird's foot trefoil, and mouse eared hawkweed.
Habitat type (UKHab category):	w1g - other broadleaved woodland; h3h- mixed scrub;
Habitat condition - area affected by Ndep:	Mixed scrub (h3h) condition: poor (one out of five criteria passed); other woodland, broadleaved (w1g), condition poor (score 25)
Limitation(s):	The woodland on the cliff top was not accessible and neither were any of the cliff faces. The historic map shows the woodland at the top of the cliff was present in 1885, and it is likely to have been woodland since at least that time. Access was only possible of certain parts of the chalk pit base, due to impenetrable scrub.
Habitat sensitivity - Area affected by Ndep:	Survey of Cuxton Pit SINC recorded species with every EV between 3 and 8 inclusive. No AWIs or nitrophobes were recorded at the pit base. No nitrophiles were frequent. The nitrophile herb Robert EV6, as species known to respond to increased nitrogen, was occasional (Pitcairn et al., 2006). Nitrophiles which occurred rarely were false oat-grass (EV7), cock's foot (EV6), creeping bent (EV6), (can invade rapidly), Yorkshire fog EV5 (potential to increase rapidly), and bramble EV6 (known to respond to increased nitrogen) Pitcairn et al (2006).

Assessment

Table 6.73 Cuxton Pit No. 3, Strood LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 52.29 DM: 48.62 DS: 50.79
Operation - Ndep increase (max for site) kg N/ha/yr	2.16
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	21.61
Operation - increase over 0.4 kg N/ha/yr	1.76
Operation - impact extent (ha)	4.07
Operation - impact extent (% of site)	58.72
Operation - impact duration (years until emissions DS = DM at opening yr)	14
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.39.1 The increase in N deposition (DS-DM) is 2.16kg N/ha/yr. The site supports a mosaic of calcareous grassland, scrub and broadleaved deciduous woodland. The lowest LCL of these habitats is 10kg N/ha/yr (broadleaved deciduous woodland) and the increase in N deposition is 21.6% of this LCL.

There are numerous species with low EVs and potentially sensitive to nitrogen. These are species typical of calcareous grassland on thin soils, such as common centaury, common spotted orchid, common milkwort, kidney vetch, yellow wort, fairy flax, common bird's foot trefoil, and mouse eared hawkweed. However, the development of dense scrub described in the citation was confirmed by the detailed site investigation, with a number of scrub species characteristic of calcareous soils, such as wayfaring tree and dogwood, but also non-natives such as buddleia and INNS wall cotoneaster.

The condition and integrity of this site is already being compromised by the development of scrub, which is shading out the less competitive chalk grassland species and increasing the nutrient status of the soils as it develops. An increase in N deposition could potentially further accelerate scrub development, but the data collected on the existing vegetation suggests that succession is already advanced and that the remaining grassland is likely to scrub over even in the absence of additional nitrogen. The site would benefit from management to reduce the cover of scrub. However, increased N deposition could mean that more intensive and frequent management is required, or that management is less effective.

The sensitive species present are at risk of loss due to lack of management compounded by high N deposition. Given that more than half (58.7%) of the site is affected, there could be an impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 14 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate, which results in an effect of slight adverse (not significant).

6.40 DANE SHAW (AW_Theme_ID 1498350) AW

Baseline

Table 6.74 DANE SHAW (AW_Theme_ID 1498350) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	208_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.84
Site Description - desk study:	Ancient and semi-natural woodland, mainly deciduous woodland surrounded by fields. Adjacent to the carriageway to the south of the woodland, there is a gap running through the centre that might have been put in place for livestock to move between fields or was created by the livestock. This area is unlikely to be used by the public with livestock being so close to the woodland.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A

Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.75 DANE SHAW (AW_Theme_ID 1498350) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 41.04 DM: 38.22 DS: 38.64
Operation - Ndep increase (max for site) kg N/ha/yr	0.42
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.21
Operation - increase over 0.4 kg N/ha/yr	0.02
Operation - impact extent (ha)	0.04
Operation - impact extent (% of site)	5.12
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.40.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.42kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 4.2% of this LCL
The NAA within the site is approximately 200m away on the same side of the road as part of the assessed NAA for Yaugher Woods AW and LWS, separated by agricultural fields. The aerial canopy cover and species composition looks similar to Yaugher Woods AW LWS. Therefore, in the absence of survey data it is considered reasonable to assume that the NAA of woodland for this site will have a similar species composition to that of the NAA for Yaugher Woods AW and LWS. An extract from the assessment from Yaugher Woods AW LWS is: “No lichens or vegetation gradient was observed during the site investigation. Four AWI were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Three species were identified with an EV of 4 and two with an EV of 3, clustered bell flower and bracken. A total of 4 nitrophiles were present in the field layer, including frequent to locally abundant dog’s mercury. No

nitrophobes were present".
Additional N deposition may lead to an increase in nitrophilic species, such as bramble. However, considering that 5.1% of the site will be impacted, this is unlikely to affect the site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.41 Dartford Marshes LWS

Baseline

Table 6.76 Dartford Marshes LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	42_LWS, 44_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	217.61
Site Description - desk study:	The site is designated as Dartford Marshes LWS and lies to the north and south of the A206 along the River Darent. The LWS citation describes the site as a large former grazing marsh supporting a wide range of flora and fauna, including a number of rare plant species, important wintering and breeding bird populations, and the most important water vole population in the north-west of Kent. The grazing marsh habitats comprise a mosaic of fresh and salt marsh, grazing marsh, rough unmanaged grassland, dry grassland and scrub, with an interconnecting dyke system. The citation describes the rough grassland as often flooded in winter and used as permanent pasture and has an inter-connecting dyke system between the fields. Much of the grassland near the River Thames consists of very dull sown leys, but south of University Way lies a large area of damp, unimproved grazing marsh and a small area of reed-fringed open water. Although currently in need of restorative work, the unpolluted dyke system is rich in both aquatic and marginal species. Greater bladderwort,

	four species of pondweed, including lesser pondweed, and fan-leaved water-crowfoot been recorded along with more common species. Marsh woundwort and grey club-rush are also present. Flowering rush, frogbit and brookweed were formerly present and could re-establish according to the LWS citation. The muddy banks of Dartford Creek support a mixture of both saltmarsh species and those freshwater species tolerant of saline conditions. Some stretches are dominated by large reedbeds, but grazing cattle are opening up opportunities for smaller species such as sea-milkwort and sea arrowgrass, and marsh sow thistle been recorded here. Further stretches of saltmarsh dominated by sea aster are along the foreshore of the Thames. Much of the eastern half of the site is comprised of unmanaged, rough dry pasture and scrub. Among the robust grasses, thistles and common plants of disturbance such as hemlock, bristly ox-tongue and teasel are shorter, rabbit-grazed areas where knotted hedge-parsley and bird's-foot-trefoil are present. Deadly nightshade is found in the shady hedgerows. The sea walls support a flora of very dry conditions. The inner wall in particular has a very large population of the local narrow-leaved bird's-foot-trefoil and there are several large stands of dittander.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A

Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.77 Dartford Marshes LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 27.08 DM: 27.78 DS: 28.2
Operation - Ndep increase (max for site) kg N/ha/yr	0.42
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.22
Operation - increase over 0.4 kg N/ha/yr	0.02

Operation - impact extent (ha)	0.09
Operation - impact extent (% of site)	0.04
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.41.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.42kg N/ha/yr. The modelling was undertaken using an assumption that the most sensitive habitat present was deciduous broadleaved woodland habitat with a LCL of 10kg N/ha/yr. The increase in N deposition is 4.2% of this LCL. However, the LWS is designated for grazing marsh and salt marsh. The APIS website (CEH, 2022) provides a CL range for coastal and floodplain grazing marsh and for salt marsh of 20-30kg N/ha/yr but acknowledges the lack of experimental studies into N deposition effects on these habitats. However, N deposition is likely to be less important than nutrient enrichment via fertiliser wash off into drainage channels and nutrient loadings from river and tidal inputs. The NAA extends less than 10m into the site from the northern edge of the A206, which is on a bridge above the marshland of the LWS. The maximum extent of the NAA is estimated at 0.09ha, which is approximately 0.04% of the site. Given the type of habitat and the very limited extent of NAA, there is predicted to be no change in vegetation composition and no impact on the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6.42 Disused Railway Cutting, Longfield LWS

Baseline

Table 6.78. Disused Railway Cutting, Longfield LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	616a_LWS, 616b_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	2.16
Site Description - desk study:	The area is mainly young trees. The wood runs along a disused railway surrounded by fields.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.79 Disused Railway Cutting, Longfield LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 38.13 DM: 36.79 DS: 37.31

Operation - Ndep increase (max for site) kg N/ha/yr	0.52
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.18
Operation - increase over 0.4 kg N/ha/yr	0.12
Operation - impact extent (ha)	0.16
Operation - impact extent (% of site)	7.39
Operation - impact duration (years until emissions DS = DM at opening yr)	10
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.42.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.52kg N/ha/yr. A review of aerial imagery suggests that the NAA supports scrub and developing deciduous broadleaved woodland habitat either side of the B255, which is encompassed within the LWS designation. The NAA extends less than 10m either side of this road. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 5.2% of this LCL. Given that at least one third of the NAA is a minor road, the area of habitat affected is very small and no impact on site integrity is predicted.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 10 years, so is assessed as temporary and theoretically reversible.

Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible adverse impact level on a site of county value could be either neutral or slight. Given the small NAA and the precautionary measures adopted throughout the assessment, this is considered to result in a neutral effect (not significant).

6.43 Epping Forest SAC

Baseline

Table 6.80 Epping Forest SAC: Baseline

Designation:	SAC
AQ (Operation) model point codes:	EPF_193
Resource importance:	International
Overlapping site:	Epping Forest SSSI
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1628.87
Site Description - desk study:	See HRA Appendix D for details of the detailed survey work completed in May 2020
Site Condition - As described in citation/by site manager:	Natural England assessed the site (in Jan 2010) as being in favourable condition
Dates surveyed (2021 and 2022):	SAC survey 7,9,18 May 2020 (see HRA report Appendix D) 09/06/2022
Field survey habitat parcel descriptions:	The survey area supports mature broadleaved semi-natural woodland, with two woodland habitat and vegetation types recorded. The woodland nearest the M25 was generally more heavily disturbed by public use with a sparse understorey and younger trees and heavily disturbed ground. The boundary between the two was very marked, following the route of a footpath, with younger oak woodland lying to the north and mature mixed woodland in the interior of the site to the south. Most of the area comprised the UK Habitat Classification type 'w1c5 Beech forests on acid soils (H9120)', an Annex I habitat and qualifying feature of Epping Forest SAC.
Lichens:	Insufficient oaks and/or birch with lichens due to heavy shading, though one oak adjacent to the road found supporting Physcia sp

Vegetation gradient:	Clear gradient of nettles and cleavers, dominant in first 2-3m adjacent to road, frequent for a further 10m into wood and then becoming rare further in. Likely to be partly due to light levels, as ground further into the woodland was bare. It could also be related to increased nitrogen levels, but this effect cannot be quantified.
Notes on active management (field survey observations):	Possibly more extensive pollarding to increase light levels in places and encourage regeneration.
Notes on required or beneficial management (field survey observations):	1) Pollution control of sewage outlet; 2) High forest. Management limited to some clearance of dead wood from paths and occasional pollarding of trees, probably in part for reasons of public safety. The site is heavily used for recreation by the public, including many dog walkers which may contribute to nutrient enrichment. High forest causing dense shading in many places with bare ground predominant and a consequent lack of regeneration. Dead wood very abundant, clearly intentionally left in situ.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Within the NAA the 2022 survey found signs of deer browsing and one cherry laurel. Polluted runoff running deep into the woodland, probably sewage outflow associated with yew tree cottage on the other side of the road. Outflow appears to flood extensively at times. See HRA for further details.
Ellenberg values:	min 3, max 8, mean 5.75
Ellenberg value score 4 and below:	EV 4: silver birch, wavy hair-grass, soft rush, pedunculate oak, and ragwort. EV 3: bracken.
Habitat type (UKHab category):	w1g7 - other broadleaved woodland
Habitat condition - area affected by Ndep:	Moderate, 32 points (the upper limit of moderate)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Epping Forest NAA recorded a mixture of high and low EVs. There were no AWI with an EV of 4, indicating lack of sensitivity to nitrogen. Several nitrophiles (Pitcairn et al., 2006) were frequent in the ground layer including bramble (EV6, known to respond to increased nitrogen), Yorkshire fog (EV 5, which had potential to increase), creeping bent (EV6, can invade rapidly), and cleavers (EV8, the highest recorded at this site).

Assessment

Table 6.81 Epping Forest SAC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 61.5 DM: 58.53 DS: 59.53
Operation - Ndep increase (max for site) kg N/ha/yr	1.01
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	10.05
Operation - increase over 0.4 kg N/ha/yr	0.61
Operation - impact extent (ha)	0.3
Operation - impact extent (% of site)	0.02
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.43.1 The increase in N deposition (DS-DM) is 1.01kg N/ha/yr, which is 10.1% of the LCL for broadleaved deciduous woodland. The SAC is assessed as part of the Habitats Regulations Assessment – Screening Report and Statement to Inform an Appropriate Assessment (HRA) of the Project (Application Document 6.5). The NAA is in the north-eastern corner of the site and constitutes 0.02% of the SAC designation. The baseline vegetation composition of the NAA is described in the HRA report Appendix D (Application Document 6.5) and the assessment concluded that the change in N deposition would have no effect on the integrity of the SAC.
Given the small area affected and the absence of sensitive species in the NAA, the increase in N deposition at this part of the site is not considered to affect the key characteristics or the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, resulting in a slight effect (not significant).

6.44 Epping Forest SSSI

Baseline

Table 6.82 Epping Forest SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	56_SSSI_AW, EPF_193
Resource importance:	National
Overlapping site:	Epping Forest SAC
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1787.92
Site Description - desk study:	See HRA Appendix D for details of the detailed survey work completed in May 2020

Site Condition - As described in citation/by site manager:	Same as Epping Forest SAC
Dates surveyed (2021 and 2022):	SAC survey 7,9,18 May 2020 (see HRA report Appendix D) 09/06/2022
Field survey habitat parcel descriptions:	High forest with abundant pedunculate oak and frequent silver birch and ash over an understorey of frequent hornbeam, holly and hawthorn. There is an abundance of dead wood and some large old tree pollards. The ground layer is generally quite sparse due to heavy shading, but in more open areas includes frequent bramble, Yorkshire fog, bracken, enchanter's nightshade, male fern, cleavers, wood dock and, in wetter areas, remote sedge.
Lichens:	Insufficient oaks and/or birch with lichens due to heavy shading, though one oak adjacent to the road found supporting Physcia sp.
Vegetation gradient:	Same as Epping Forest SAC i.e. clear gradient of nettles and cleavers, dominant in first 2-3m adjacent to road, frequent for a further 10m into wood and then becoming rare further in. Likely to be partly due to light levels, as ground further into the woodland was bare. It could also be related to increased nitrogen levels, but this effect cannot be quantified.
Notes on active management (field survey observations):	Possibly more extensive pollarding to increase light levels in places and encourage regeneration.
Notes on required or beneficial management (field survey observations):	1) Pollution control of sewage outlet; 2) High forest. Management limited to some clearance of dead wood from paths and occasional pollarding of trees, probably in part for reasons of public safety. The site is heavily used for recreation by the public, including many dog walkers which may contribute to nutrient enrichment. High forest causing dense shading in many places with bare ground predominant and a consequent lack of regeneration. Dead wood very abundant, clearly intentionally left in situ.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Within the NAA the 2022 survey found signs of deer browsing and one cherry laurel. Polluted runoff running deep into the woodland, probably sewage outflow associated with yew tree cottage on the other side of the road. Outflow appears to flood extensively at times. See HRA for further details.
Ellenberg values:	min 3, max 8, mean 5.75
Ellenberg value score 4 and below:	EV 4: silver birch, wavy hair-grass, soft rush, pedunculate oak, and ragwort. EV 3: bracken
Habitat type (UKHab category):	w1g7 - other broadleaved woodland
Habitat condition - area affected by Ndep:	Moderate, 32 points (the upper limit of moderate)

Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Epping Forest NAA recorded a mixture of high and low EVs. There were no AWI with an EV of 4, indicating lack of sensitivity to nitrogen. Several nitrophiles (Pitcairn et al., 2006) were frequent in the ground layer including bramble (EV6, known to respond to increased nitrogen), Yorkshire fog (EV 5, which had potential to increase), creeping bent (EV6, can invade rapidly), and cleavers (EV8, the highest recorded at this site).

Assessment

Table 6.83 Epping Forest SSSI: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 61.5 DM: 58.53 DS: 59.53
Operation - Ndep increase (max for site) kg N/ha/yr	1.01
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	10.05
Operation - increase over 0.4 kg N/ha/yr	0.61

Operation - impact extent (ha)	0.3
Operation - impact extent (% of site)	0.02
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.44.1 The increase in N deposition (DS-DM) is 1.01kg N/ha/yr, which is 10.1% of the LCL for broadleaved deciduous woodland. The NAA is in the north-eastern corner of the site and constitutes 0.02% of the SSSI designation. In the NAA, the boundaries of the SSSI and the SAC coincide and are adjacent to the B1393 but Epping-Ambresbury Banks AW does not extend as close to the road. Therefore, the assessment of potential impacts in the NAA focuses on the SSSI and the SAC, although part of the NAA is also AW. The baseline vegetation composition of the NAA is described in the HRA report Appendix D (Application Document 6.5)
Given the small area affected and the absence of sensitive species in the NAA, the increase in N deposition at this part of the site is not considered to affect the key characteristics or the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, resulting in a slight effect (not significant).

6.45 Epping-Ambresbury Banks AW

Baseline

Table 6.84 Epping-Ambresbury Banks AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	55_AW, 67_AW, EPF_193

Resource importance:	National
Overlapping site:	Epping Forest SAC, Epping Forest SSSI
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1121.52
Site Description - desk study:	The site is classified in the Ancient Woodland inventory for England as 'ancient replanted woodland'. It lies adjacent to and to the south of the M25 and to the north of Epping Forest SSSI and SAC. No further desk study information about the site is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	28/07/2022
Field survey habitat parcel descriptions:	The woodland is high forest with little or no understorey and sparse ground layer. The canopy has pedunculate oak co-dominant with Scots pine, but its composition varied considerably. Other species included occasional to abundant sycamore, occasional to frequent beech and occasional silver birch and wild cherry, elder and rhododendron were rare in the understorey. The ground was often bare, with scattered bracken, soft rush, creeping soft grass and foxglove. No AWI were present. Signs of management were limited to occasional tree thinning. A large group of fallow deer was seen. No woodland regeneration was observed.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Limited tree thinning observed.
Notes on required or beneficial management (field survey observations):	Beneficial management for nature conservation would be the removal of conifers and re-planting with native trees and shrubs
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Threats are lack of woodland management, including overgrazing by deer. Rhododendron was present

Ellenberg values:	min 2, max 8, mean 4.48
Ellenberg value score 4 and below:	Species with EV 4: common bent, silver birch, Lawson's cypress, tufted hair grass, soft rush, pedunculate oak and common ragwort; Species with EV3: creeping soft grass, bracken and rhododendron; species with EV2: Sitka spruce, Corsican pine and Scots pine.
Habitat type (UKHab category):	w1h - Other woodland; mixed
Habitat condition - area affected by Ndep:	Poor (score 20)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Epping-Ambresbury Banks AW recorded species with every EV between 2 and 8 inclusive. No AWI or nitrophobes were recorded. Three nitrophiles were present, all of which had a DAFOR value of occasional or rare as follows: common nettle, EV8 and an indicator of nutrient enrichment, was occasional; bramble EV6, was rare. This species is known to respond to increased nitrogen; and ground ivy, EV7, which can spread rapidly with increased nitrogen, was rare, Pitcairn et al (2006). No vegetation gradient was observed.

Assessment

Table 6.85 Epping-Ambresbury Banks AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.51 DM: 53.22 DS: 54.02
Operation - Ndep increase (max for site) kg N/ha/yr	0.81
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	8.05
Operation - increase over 0.4 kg N/ha/yr	0.41
Operation - impact extent (ha)	1.73
Operation - impact extent (% of site)	0.15
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.45.1 The increase in N deposition (DS-DM) is 0.81kg N/ha/yr, which is 8.1% of the LCL for broadleaved deciduous woodland. Epping-Ambresbury Banks AW overlaps with the NAA within Epping Forest SAC and SSSI in the north-eastern corner of the sites, but there is a larger NAA affecting an undesignated area of AW further to the west. The assessment of the AW focuses on this NAA, which largely comprises a strip of woodland up to 30m wide adjacent to the M25. No AWI or nitrophobes were recorded in the NAA. Species that may increase in response to increased N deposition were recorded, including common nettle (EV8), bramble (EV6) and ground ivy (EV7). No vegetation gradient or lichens on suitable trees were observed.

Given the small proportion of the site affected (0.2%) and the absence of sensitive species in the NAA, the increase in N deposition at this part of the site is not considered to affect the key characteristics or the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and

theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, resulting in a slight effect (not significant).

6.46 Folkes Lane Woodland SINC

Baseline

Table 6.86 Folkes Lane Woodland SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	609a_SINC
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	48.02
Site Description - desk study:	Former arable fields bordering a steep hill, now cut through by the M25 motorway, most of which has been planted up with trees. These are mostly native broad-leaves, with some Scots pine and larch. The trees are now maturing and are bordered in places by bramble patches and blackthorn thickets. Areas of woodland are separated by broad grassy rides and a large open area has been left on high ground towards the northern end of the site. Parts of this are rich in flowering plants, including knapweed and devils-bit scabious. The site includes several ancient hedges with many massive oaks, some stag-headed and almost all containing nest holes, plus sweet chestnut, wild service, elm and hawthorn. Ground flora includes wood sage, hedge woundwort and great horsetail. A small pond has been created with good aquatic vegetation. This large site provides good habitat for a variety of birds and small mammals and forms part of a wildlife corridor running alongside the M25 to its west (https://democracy.havering.gov.uk/documents/s23941/Annex%2033%20-%20Havering%20SINC%20Review.pdf)

Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.87 Folkes Lane Woodland SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 45.56 DM: 44.35 DS: 48.26
Operation - Ndep increase (max for site) kg N/ha/yr	3.91
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	39.11
Operation - increase over 0.4 kg N/ha/yr	3.51
Operation - impact extent (ha)	22.81
Operation - impact extent (% of site)	47.49
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Major adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.46.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 3.91kg N/ha/yr. Aerial imagery indicates that suggest that the site supports broadleaved deciduous woodland. The citation for the SINC describes former arable fields planted up with trees, mostly native broadleaves. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 39.1% of this LCL. The area affected is 47.5% of the SINC and the time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, it is precautionary to assume there could be an effect on site integrity.
Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of county value could be either slight or moderate. Given the precautionary measures adopted throughout, the effect is assessed as slight adverse (not significant).

6.47 Foxburrow Wood, Upminster SINC

Baseline

Table 6.88 Foxburrow Wood, Upminster SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	76_AW_LWS
Resource importance:	County
Overlapping site:	AW_Theme_ID1420012 AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.07
Site Description - desk study:	Site description (2006) lists this site as a small ancient wood on acid soils, part of which has been replanted with conifers. The dominant trees are pedunculate oak and silver birch with occasional old rowan and hazel coppice stools. The ground flora is dominated by bramble and bracken. The wood has been planted with Norway maple and wild cherry. There are large areas of planted conifers, mainly spruce. Aerial photos show a relatively closed canopy

	with small opening in the southern part of the site. The wood itself is connected to an undesignated woodland of similar size to the south and is surrounded by the M25 to the east, farmland to the north and housing development to the west.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.89 Foxburrow Wood, Upminster SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.7 DM: 46.98 DS: 47.62
Operation - Ndep increase (max for site) kg N/ha/yr	0.64
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.41
Operation - increase over 0.4 kg N/ha/yr	0.24
Operation - impact extent (ha)	1.12
Operation - impact extent (% of site)	53.93
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Major adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.47.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.64kg N/ha/yr. A review of aerial imagery suggests that the NAA supports deciduous broadleaved woodland habitat. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 6.4% of this LCL. AW_Theme_ID1420012 AW overlaps with this SINC.
The citation describes this site as a small ancient wood on acid soils, part of which has been replanted with conifers. The ground flora is described as dominated by bramble and bracken, suggesting a lack of less competitive species that may be sensitive to nitrogen.
However, given the absence of survey data and the area affected (52% of the AW) a precautionary approach has been used and it is considered that increased N deposition has the potential to affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Therefore, the impact level has been assessed as major adverse, which results in an effect of large adverse (significant).

6.48 Franks Wood and Cranham Brickfields SINC

Baseline

Table 6.90 Franks Wood and Cranham Brickfields SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	517_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	42.64

Site Description - desk study:	Franks Wood and Cranham Brickfields (location post code RM14 1NL, NGR TQ5786 8843) is a large SINC. MAGIC maps (2022) shows the habitat within the NAA as the priority habitat deciduous woodland with low confidence.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	12/07/22
Field survey habitat parcel descriptions:	The woodland in this NAA appears to have developed from a mosaic of grassland and scattered oaks, with more mature oak in the west. Pedunculate oak is frequent in the canopy and hawthorn frequent in the understorey. Two age classes of oak are present, mature oaks scattered amongst frequent semi mature trees. The field layer has frequent ivy and bramble. The eastern area probably succeeded to woodland naturally in the last 30 years and had a grassier ground layer with fewer mature trees than the west area.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No observable gradient
Notes on active management (field survey observations):	Evidence of historic fly tipping in the wood, from a time when the habitat was more open and it was presumably possible to drive into it.
Notes on required or beneficial management (field survey observations):	Removal of rubbish
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	min 3, max 8, mean 5.86
Ellenberg value score 4 and below:	common bent 4, pedunculate oak 4, compact rush 3.
Habitat type (UKHab category):	w1f- lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (29 points)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of the NAA within Franks Wood and Cranham Brickfields SINC recorded species with every EV between 3 and 8 inclusive. The AWI spindle and wood millet were present

	(both E5), but there were no AWI species present with EV 3 or 4. The nitrophiles bramble EV6, (known to respond to increased nitrogen), ivy EV7 and nettle EV8 (an indicator of nutrient enrichment) were frequent in the field layer. Cleavers EV8, also an indicator of nutrient enrichment, was rare. The nitrophile cock's-foot EV6 was occasional in the field layer. No vegetation gradient was evident.

Assessment

Table 6.91 Franks Wood and Cranham Brickfields SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.37 DM: 46.73 DS: 49.4
Operation - Ndep increase (max for site) kg N/ha/yr	2.67
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	26.67
Operation - increase over 0.4 kg N/ha/yr	2.27
Operation - impact extent (ha)	2.56
Operation - impact extent (% of site)	6.0

Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.48.1 The increase in N deposition (DS-DM) is 2.67kg N/ha/yr. Within the NAA the site supports broadleaved deciduous woodland. The LCL for this habitat is 10kg N/ha/yr and the increase in N deposition is 26.7% of this LCL. It is estimated that 6% of the site is affected by increased N deposition (the NAA). There is a small amount of vegetation removal as part of the Project, of which a fraction is in the NAA and this makes no difference to the outcome of the assessment of effects of increased N deposition.
The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. No AWI indicator species with EV values of 3 or 4 were recorded. The only species with EV 3 was compact rush. Nitrophiles bramble (EV6), ivy (EV7) and nettle (EV8), which respond to increased N deposition (Pitcairn et al, 2006),) were frequent in the field layer. The absence of sensitive AWI species and frequently recorded nitrophiles suggests there is unlikely to be a significant change in vegetation composition due to an increase in N deposition. Considering the species composition and area affected (6%) there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the small proportion of the site affected, and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.49 Frith Woods Etc., Kits Coty LWS

Baseline

Table 6.92 Frith Woods Etc., Kits Coty LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	47_LWS, 193 AW
Resource importance:	County
Overlapping site:	Impton/Podkin Wood AW
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	27.06
Site Description - desk study:	Frith Woods etc., Kits Coty LWS lies along the south side of the M2 extending south west to Warren Road. The site overlaps with Impton/Podkin AW. The sites differ in that the AW extends further to the north-west (around the crematorium), the LWS includes a large unwooded area in central/eastern area, and the AW does not include a vegetated strip adjacent to the M2 (although the latter may well be a mapping error). The LWS is designated for its 18 hectares of ancient woodland and an unimproved horse grazed pasture. The description states the site comprises ancient mixed broadleaved woodland on the heavy plateau clays of the North Downs above Bluebell Hill, and unimproved grassland along the north-western edge of the wood. It was formerly managed as coppice-with-standards but is now heavily shaded with over-mature coppice and standards of pedunculate oak. Sweet chestnut coppice is present in parts but mixed coppice of ash, hazel and field maple also occur. Dense hornbeam coppice is also present, particularly at the eastern end. The rides are very damp and shady. The woodland ground flora is dominated by bramble and bluebell but other common woodland herbs including orchids are also present. Sycamore has seeded in at the western end of the site. The soils are more calcareous on the western side and butcher's broom and old man's beard can be seen in this part. The unimproved grassland is heavily horse-grazed grassland, and commoner species characteristic of chalk downland have been recorded, including cowslip,

	salad burnet, oxeye daisy and bird's foot trefoil, but the grassland is disturbed by heavy grazing.
Site Condition - As described in citation/by site manager:	The LWS description (June 2007) states that the woodland is heavily shaded from overmature coppice and that the rides are damp and shady. It also states that sycamore has seeded in west of the site and that the woodland ground flora is dominated by bramble and bluebell. No further information is provided.
Dates surveyed (2021 and 2022):	12/10/202, 06/02/2021, 20/07/2022
Field survey habitat parcel descriptions:	Habitat parcel 1 (parallel to M2): Established woodland has abundant old sweet chestnut coppice in the canopy with frequent ash, oak standards, and occasional hornbeam. The understorey has frequent hazel, hawthorn, field maple and occasional midland hawthorn. The woodland field layer generally conforms with W10 (oak-bracken-bramble) with abundant bramble and bluebell. Five AWIs were recorded: bluebell, bush vetch, wood speedwell, yellow archangel and wood millet. The roadside woodland (Quadrat 1) is recently planted (estimated to be 20 years) and includes ash, hawthorn, hazel, wayfaring trees and spindle. Many of the young trees still have plastic guards. The AW and roadside woodland are separated by a well-used footpath. Habitat parcel 2 (parallel to Warren Road) Old coppiced woodland with abundant canopy sweet chestnut and ash with occasional oak, sycamore, wild cherry, and silver birch. The understorey has abundant hawthorn and frequent hazel. Most of the ground layer is typical of W10 with abundant bramble and bluebell but locally abundant dog's mercury. Five AWIs were recorded: wood speedwell, bluebell, redcurrant, yellow archangel, and herb Paris.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1 (parallel to M2). Recent woodland adjacent to road: Overgrown, young planted trees with plastic tubing, hazel coppice stools. Gabion reinforced wall on layby; established woodland: no observable management. Habitat parcel 2 (parallel to Warren Road): No active management observed. Area used for biking with resultant disturbance throughout woodland and compaction of soil along trails.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1 (parallel to M2), recent woodland: remove tree protectors. Remove litter thrown into the woodland from passing cars. Habitat parcel 2 (parallel to Warren Road):

	Resume coppicing to increase areas of natural light within woodland; put in place further measures to deter bikes.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1 (parallel to M2): surveyed on 2/6/21 identified 'minimal recreational pressure' along this transect. The LWS description states the LWS was formerly managed as coppice with standards with the woodland now heavily shaded with over-mature coppice and the rides are heavily shaded. Therefore lack of woodland management appear to be the main threat. The invasive species variegated yellow archangel and cherry laurel were observed. No other pressures or threats were identified during the site investigation. The LWS citation (dated 2007) describes the unimproved grassland (which lies outside the NNA) as being heavily grazed and disturbed and therefore this grassland appears to be managed too intensively to establish species rich calcareous grassland. Habitat parcel 2 (parallel to Warren Road, surveyed 20/02/22): No active management observed. Area used for biking with resultant disturbance throughout woodland and compaction of soil along trails.
Ellenberg values:	Habitat parcel 1 (parallel to M2, includes recent and established woodland): min 4, max 8, mean 5.65; Habitat parcel 2 (parallel to Warren Road): min 3, max 8, mean 5.85
Ellenberg value score 4 and below:	Habitat parcel 1, (parallel to M2) EV4: silver birch, tufted hair grass, pedunculate oak, and rowan. Habitat parcel 2 (parallel to Warren Road) EV4: silver birch, downy birch, tufted hair grass, smaller cat's tail, pedunculate oak, and common ragwort. EV3: cat's ear.
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1 (parallel to M2), condition assessment for recent woodland between M2 and fence: poor (score 24 points); condition assessment for established woodland moderate (score 29 points). Habitat parcel 2 (parallel to Warren Road) moderate (score 27).
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of the woodland Habitat parcels 1 and 2 recorded species with every EV between 2 and 8 inclusive. Five AWI indicators were recorded in Habitat parcel 1 and five AWI were recorded in Habitat parcel 2, none of which were EV4 or lower. No nitrophobes were present in the field layer of Habitat parcel 1, and only one was recorded in Habitat parcel 2. A total of ten nitrophiles were present in Habitat parcel 1, including abundant bluebell EV6 (may respond to increased nitrogen in moist soils), abundant bramble EV6 (known to respond to increased nitrogen) and frequent hedge woundwort EV8 Pitcairn et al (2006). Habitat parcel 1 had species of EV8: garlic mustard and hedge woundwort. A total of thirteen nitrophiles

	were present in Habitat parcel 2, including abundant rough meadow grass EV6 (known to respond to increased nitrogen), abundant bramble EV6 (known to respond to increased nitrogen), occasional to locally abundant dog's mercury EV7 (known to respond to increased nitrogen), abundant bluebell EV6 (may respond to increased nitrogen in moist soils) and frequent ground ivy EV7 Pitcairn et al (2006). Habitat parcel 2 had species of EV8 which could indicate nutrient enrichment: garlic mustard, hedge woundwort, nettle and cleavers. The mean EV of Habitat parcel 2 (5.85) was higher than the mean EV of Habitat parcel 1 (5.65), and had seven species of EV4 or lower, compared to four species of EV4 or lower in Habitat parcel 1.

Assessment

Table 6.93 Frith Woods Etc., Kits Coty LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.34 DM:45.95 DS:46.48
Operation - Ndep increase (max for site) kg N/ha/yr	0.54
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.38

Operation - increase over 0.4 kg N/ha/yr	0.14
Operation - impact extent (ha)	1.81
Operation - impact extent (% of site)	6.69
Operation - impact duration (years until emissions DS = DM at opening yr)	6
Mitigation proposed	M2 Jct3-4 Speed Enforcement, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Negligible adverse
Level of significance	Not significant (after mitigation)
Compensation proposed	Not required

Assessment Rationale

6.49.1 M2 Junction 3-4 mitigation has been applied to this site. After mitigation, the increase in N deposition (DS-DM) is 0.54kg N/ha/yr. There are two NAAs, one in the north-east near to the M2 and one in the south-west, adjacent to Wouldham to Detling escarpment SSSI. These areas support mixed deciduous woodland (UK Habs W1f) and a LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been used. The increase in N deposition is 5.4% of this LCL.
The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation.
Five AWI plant species were identified within each NAA, all of which are considered nitrophilic and had an EV value of 6, except for the rarely recorded wood millet (EV5). Of the AWI species recorded, bluebell (EV6) was abundant, and this species may respond to increased nitrogen in moist soils (Pitcairn et al, 2006).
Four species with EVs of 4, including tufted hair-grass and ten nitrophilic species, including the frequently recorded hedge woundwort (EV8) were recorded within the NAA in the north-east. No nitrophobic species were recorded in this area.
In the NAA in the south-west, one nitrophobic species (cat's ear, EV3), six species with an EV score of 4 and 13 nitrophilic species were recorded. The nitrophilic species recorded includes abundant bramble (EV6, known to respond to increased nitrogen (Pitcairn et al., 2006)) and nettle (EV8, species indicating the presence of nutrient enrichment).
An increase in N deposition may increase the growth of nitrophilic species, including bluebell and bramble, and risk the loss of cat's ear (although this is not a typical woodland species), which may lead to a loss of floristic diversity in the NAAs. However, only 6.7% of the total site is likely to be affected and therefore there is unlikely to be an impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 6 years, so is assessed as

temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the small proportion of the site affected, and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.50 Frith_Impton Woods AW

Baseline

Table 6.94 Frith_Impton Woods AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	194_AW, 197_AW, 256_AW, 258_AW, 258b_AW, 303_AW, 327_AW, 373a_AW, 373b_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	35.74
Site Description - desk study:	Frith/Impton Wood AW is a large fragmented woodland, with discontinuous sections around and predominantly to the south of junction 3 of the M2. AW_Theme_ID_1498717 is among the blocks assigned to Frith/Impton Woods, but there is no overlap. One of Frith/Impton Woods includes Walderslade Woods LWS, although this is not within the NAA. The LWS description states that its ancient woodland has over 30 AWI.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	12/10/2021, 17/11/2021, 20/06/2022, Habitat parcel 5 - 03/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1 (ThemeID1498716): This is a long narrow woodland running NW-SE (to the east of the A2045 and west of Taddington Wood Lane) and is a remnant of hornbeam woodland with a yew-holly understorey. Coppiced hornbeam and sweet chestnut are frequent in the canopy. The south east section comprises mostly sweet chestnut coppice.

	The middle section has an oak/hornbeam canopy with yew and holly frequent in the understorey. In the north west section the woodland widens and is mixed woodland with occasional hornbeam. Some old large, sweet chestnut coppice and oak are present. Two oaks had a circumference of over 275cm. There are some introduced and invasives species including cherry laurel growing to 2m high. Variegated yellow archangel and numerous Norway maple seedlings are all threats. There is evidence of garden plant dumping and one patch of bracken. There is plenty of leaf litter and AWIs. Much of the field layer is bramble. Canopy quite closed but where more open, bracken is establishing. Seven AWI were recorded of which bluebell was occasional, and the others, including wood anemone, remote sedge, wood sedge, wood spurge, wood millet and wood meadow grass, were rare. Habitat parcel 2 (ThemeID1498715): This is located to the west of the A2045 and east of the M2, opposite Habitat parcel 1. The canopy comprised frequent hornbeam and beech with occasional sweet chestnut. The larger trees follow the line of the track with younger trees (20-30cm DBH) higher up the slope and lower down towards the road. The field layer had abundant ivy and bramble but three species of fern and the following four AWIs were recorded: field maple, wood anemone, bluebell and barren strawberry. There was evidence of deer with browsing of grasses and forbs. This woodland is on a slope of 20 degrees with a wide level track bisecting it parallel to the road. Habitat parcel 3: A linear strip of NAA adjacent to the east of the M2 and south of Habitat parcel 2. This woodland habitat included a multi-stemmed young (less than 30 years) coppiced sweet chestnut about 30m tall, arising from an ancient stool base, without any intermediate or mature trees. Ash is occasional to frequent in the canopy, young hornbeam is rare. Sparse and open understorey with abundant brambles, although species diversity is high between brambles. Broadleaved helleborine present (1 stem recorded). Habitat parcel 4: A linear strip of NAA adjacent to the east of the M2 and south of Habitat parcel 3 The canopy had abundant historically coppiced even age sweet chestnut stems arising from stools up 2 m in diameter and occasional ash and silver birch. Understorey open with sparse understorey predominantly of hornbeam. No standards. Little standing dead wood. No active management. Very little recreational pressure. Sparse fallen dead wood. Abundant leaf litter with AWIs bluebell, wood spurge, primrose wood speedwell, with some woodland ferns. In the middle of this Habitat parcel is an embankment and a possible historic quarry forming a deep valley with lots of planted species including periwinkle with field maple, wayfaring tree, hazel, hawthorn. Habitat parcel 5: This mixed deciduous woodland had overgrown coppice and standards in a

	canopy of abundant sweet chestnut and hornbeam. Other canopy species included occasional pedunculate oak and ash. Hornbeam was frequent in the understorey, while holly, hazel and midland hawthorn were all occasional. The field layer had abundant bramble, ivy, and bluebell. AWI observed in the field layer were bluebell, field rose, and black bryony. A footpath ran through the woodland but did not appear to be heavily used. There was abundant dead wood and some open areas from tree falls.
Lichens:	No lichens on suitable trees.
Vegetation gradient:	No observable vegetation gradient in any of the five Habitat parcels.
Notes on active management (field survey observations):	Habitat parcels 1 and 2: No active management observed. Habitat parcel 3: path maintenance to keep them clear; recent coppice. Habitat parcel 4: Path maintenance. Habitat parcel 5: No signs of recent management
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: control/remove invasive cherry laurel and Norway maple seedling. Install an interpretation board to explain why invasive species removal is required and the threat invasive species pose to ancient woodland. Put in measures to control/prevent dumping of garden waste; very sparse ground cover, so measures needed to encourage natural regeneration e.g. fencing to reduce grazing. Habitat parcel 2: Remove invasive species. Fence eroded area to allow soil recovery. Remove hardcore and other rubbish. Habitat parcel 3: Clear additional areas in the woodland as sweet chestnut is dense, so little light reaching ground level. Habitat parcel 4: The woodland is dominated by multi-stemmed sweet chestnut coppice, which has a fairly even age. Suggested woodland enhancement is to re-instate selective coppicing of some of these ancient stools from which the m-s coppice is growing, to allow more light to reach the ground layer and stimulate the seed bank. Habitat parcel 5: Re-instatement of coppicing, especially of hornbeam; control of the invasives cherry laurel and Wilson's honeysuckle.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: Lack of management, with few saplings, so potentially deer grazed. The canopy is dense, with little light reaching ground level. The field layer has frequent to locally abundant bramble; cherry laurel and variegated archangel. A public footpath runs through the site which is used by members of the public, so there is potential for disturbance, trampling and soil compaction. Garden rubbish being dumped, potentially introducing further non native species. Habitat parcel 2: A substantial area of bare ground was observed, which appears to be compacted/eroded ground. The bare earth path is between two and ten metres wide with the wider area extending 50m long, within and area of the wood where

	there are two large beech and mature hornbeam and oak. Cherry laurel and rhododendron present, including their seedlings. There is historical hard core dumping with some garden waste. Habitat parcel 3: The woodland is situated between two busy roads, which therefore isolates it. Used by the public, potentially disturbing wildlife. Bramble overgrowth. Habitat parcel 4: The woodland is situated between two busy roads, which therefore isolates it. Public access possible but no evidence of public use. Habitat parcel 5: The woodland is sandwiched between a housing estate and a busy slip road, which therefore isolates it. Ash dieback was observed, and there are invasives present, Wilson's honeysuckle and cherry laurel.
Ellenberg values:	Habitat parcel 1: min 3, max 7, mean 5.41; Habitat parcel 2: min 3, max 8, mean 5.54: Habitat parcel 3: min 4, max 8, mean 5.59; Habitat parcel 4: min 3, max 8, mean 5.70 Habitat parcel 5: min 4, max 8, mean 5.92
Ellenberg value score 4 and below:	Habitat parcel 1: five species with EV 4: wood anemone, silver birch, tufted hair-grass pedunculate oak and rowan. EV3: bracken. Habitat parcel 2: five species with EV 4: wood anemone, silver birch, tufted hair grass, pedunculate oak and rowan. Habitat parcel 3: eight species with EV 4: common bent, wood anemone, silver birch, tufted hair grass, wild strawberry, primrose, holly oak, and sessile oak. Habitat parcel 4: seven species with EV4: wood anemone, silver birch, wall cotoneaster, tufted hair grass, primrose, sessile oak and common vetch. Habitat parcel 5: EV 4: pedunculate oak.
Habitat type (UKHab category):	Habitat parcels 1 to 5: w1f - lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1: moderate (score 28); Habitat parcel 2: moderate (score 26) Habitat parcel 3: moderate (score 32) Habitat parcel 4: moderate (score 30) Habitat parcel 5: moderate (score 30)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of the five Habitat parcels recorded species with every EV between 3 and 8 inclusive. Overall, twelve species with EV4 were recorded and one species with EV3 (bracken). Two AWI of EV4 were recorded: wood anemone (a nitrophobe, in Habitat parcels 1, 2, 3 and 4) and primrose (a nitrophobe, in Habitat parcels 3 and 4). The following nitrophiles were frequent or abundant in the field layer: ivy EV7, (Habitat parcels 1, 2 and 5), bramble EV 6 (Habitat parcels 2, 3, 4 and 5), which is known to respond to increased nitrogen, rough meadow grass EV6, a species known to respond to increased nitrogen (Habitat parcels 3 and 4), bluebell EV6 (Habitat parcels 4 and 5), which may respond to

	increased nitrogen in moist soils and dog's mercury EV7, (Habitat parcels 4 and 5), known to respond to increased nitrogen. Cleavers, EV 8 and an indicator of nutrient enrichment, was not recorded in Habitat parcels 1 and 5 and rare in Habitat parcels 2, 3 and 4. Bracken, EV 3, a nitrophobe, was rare in Habitat parcels 1 and 2, and not recorded elsewhere. Habitat parcel 1 had the lowest mean EV value of 5.41 and Habitat parcel 5 had the highest mean EV value of 5.92; Habitat parcel 3 had the highest number of nitrogen sensitive species, 8 species (all EV4) found in any of the Habitat parcels. Habitat parcels 5 had the lowest number of nitrogen sensitive species, pedunculate oak, EV4.

Assessment

Table 6.95 Frith_Impton Woods AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 52.51 DM:48.56 DS:51.58
Operation - Ndep increase (max for site) kg N/ha/yr	3.01
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	30.14
Operation - increase over 0.4 kg N/ha/yr	2.61

Operation - impact extent (ha)	5.45
Operation - impact extent (% of site)	15.25
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	M2 Jct3-4 Speed Enforcement, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.50.1 The increase in N deposition after M2 Junction 3-4 mitigation (DS-DM) is 3.01kg N/ha/yr (reduced from 3.24kg N/ha/yr). Because Frith/Impton Woods is a large fragmented woodland, made up of multiple blocks, there are several NAAs, all of which support lowland mixed deciduous woodland. The LCL of 10kg N/ha/yr for broadleaved deciduous woodland has been applied and the increase in N deposition is 30.1% of this LCL. There was no observable vegetation gradient in any of the woodland blocks and no lichens on suitable trees were identified. It is of note that AW_Theme_ID_1498717, which has been screened out following the mitigation, is among the blocks assigned to Frith/Impton Woods, but there is no overlap. Given there are five NAA in different woodland blocks within the boundaries of Frith/Impton Woods, there is some variability, both in baseline conditions and in the modelling for N deposition. The figures presented here are the worst case for the modelled transects within this site.

Sensitive species present within the AW are likely most at risk from lack of management. Additional N deposition has the potential to increase the spread and distribution of nitrophilic species such as bramble and may cause the loss of nitrophobic species such as wood anemone and primrose from the affected areas.

As only 5.5% of the AW is likely to be affected and the NAA is distributed across five different woodland blocks, there is unlikely to be an impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.

Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of national value could be either slight or moderate. Given the existing fragmentation of the site, and the precautionary measures adopted throughout the assessment, the effect is assessed as slight adverse (not significant).

6.51 Goshems Farm LWS

Baseline

Table 6.96 Goshems Farm LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	529_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	74.01
Site Description - desk study:	This site lies entirely within the red line boundary. Aerial imagery shows that the site was semi-natural grassland in 2012, but by 2014 the entire site has been cleared and was bare ground, and that in 2021 it remains as bare ground. Therefore the citation is no longer applicable, but provides the information that this site did support two important species populations: the nationally rare Red Data Book plant stinking goosefoot and the hornet robberfly, which is the subject of a national BAP. Other plants of interest, both included within the Essex Red Data List, are the saltmarsh (or small red) goosefoot and white horehound.
Site Condition - As described in citation/by site manager:	
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A

Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The site lies inside the red line boundary and aerial imagery shows this site was entirely bare ground in 2021, therefore no vegetation to survey.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Bare ground, no sensitive habitat present within NAA

Assessment

Table 6.97. Goshems Farm LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 16.96 DM: 16.87 DS: 17.94
Operation - Ndep increase (max for site) kg N/ha/yr	1.08
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	10.83
Operation - increase over 0.4 kg N/ha/yr	0.68
Operation - impact extent (ha)	33.13
Operation - impact extent (% of site)	44.77
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.51.1 Goshems Farm LWS was an old landfill area supporting important populations of plants and terrestrial invertebrates. During the development of the Project, much of the LWS was subject to ongoing habitat loss as part of a consented planning application by Ingrebourne Valley Ltd (IVL) (D.K. Symes Associates, 2017). At the time of writing, habitats within 85% of the LWS has been worked, with only the IVL mitigation area measuring 12ha being retained.
The landscape and ecological mitigation design for the Project in this area is the Tilbury Field proposal which would result in the creation of approximately 46ha of open mosaic habitat (see Figure 2.4 - Environmental Masterplan (Application Document 6.2) and the Design Principles (Application Document 7.5) Clause no. S9.02 and LSP.22). Although the increase in N deposition (DS-DM) in the area of Tilbury Field is 1.08kg N/ha/yr during operation, the open

mosaic habitat would be created on nutrient-poor substrate and would be managed in perpetuity to meet the requirements of the Outline Landscape and Ecology Management Plan (Application Document 6.7). Ongoing management is necessary to maintain bare earth and thin grass swards and prevent succession to scrub and tree habitat, irrespective of the magnitude of N deposition. However, an increase in N deposition could mean more frequent management intervention is required. The proportion of these habitat types and their management requirements are outlined within the outline Landscape and Ecology Management Plan. It is therefore not considered that the increased N deposition as a result of the operation of the Project would prevent high quality open mosaic habitat from establishing here. The assessment conclusion is therefore no change and a neutral effect (not significant).

6.52 Great Crabbles Wood AW

Baseline

Table 6.98 Great Crabbles Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	237_SSSI_AW
Resource importance:	National
Overlapping site:	Great Crabbles Wood SSSI
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	24.02
Site Description - desk study:	The site is designated AW and lies to the north-west of the A229, north of the A229 / M2 interchange. The site lies entirely within Great Crabbles Wood SSSI, described under that site. No further information about the AW site is available from the desk study.
Site Condition - As described in citation/by site manager:	Unfavourable recovering (SSSI citation for Unit 1, 17 May 2012). NE web site states: More open space is needed to meet favourable condition. Tree canopy cover, understorey and volume of dead wood within target. Regeneration of trees occurring - presence of saplings and young trees. Good coverage of native trees, scrub and ground flora. Bluebell, stitchwort,

	wood sedge, wood anemone, dog's-mercury, wood melick, yellow archangel and bramble noted. Some ground disturbance in the east of the Unit was noted.
Dates surveyed (2021 and 2022):	26/4/2022
Field survey habitat parcel descriptions:	High forest, predominantly W8 (ash - field maple - dog's mercury woodland) with some old sweet chestnut coppice. Appears lightly used by dog walkers and the steep slopes (south-east facing) restricts access. It has an abundance of AWIs throughout.
Lichens:	No lichens present in this woodland, potentially due to the lack of suitable tree species. Oak and birch were rare.
Vegetation gradient:	No vegetation gradient; AWI present throughout NAA.
Notes on active management (field survey observations):	There has been active coppice management of the woodland in areas, However, in the transect, only historic coppice management observed.
Notes on required or beneficial management (field survey observations):	The management should include coppicing to produce a greater variety of age diversity and structure
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey recorded minimal recreation pressure and noted some ash die back. NE condition assessment recorded minimal disturbance in east of Unit.
Ellenberg values:	min 3, max 8, mean 5.67
Ellenberg value score 4 and below:	Wood anemone 4, silver birch 4, early purple orchid 4, pedunculate oak 4; bracken 3; butcher's broom 4, ragwort 4
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	Moderate (score 30)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Across the four Habitat parcels, nitrophiles which may increase in response to increased nitrogen (Pitcairn et al., 2006) were frequent or abundant in the field layer: ivy EV7, (Habitat parcels 1 and 2), bramble EV6 (Habitat parcels 2, 3 and 4), rough meadow-grass EV6, bluebell EV6 (Habitat parcel 4) and dog's-mercury EV7, (Habitat parcel 4).

Assessment

Table 6.99 Great Crabbles Wood AW: Assessment

Habitat used for calculation of LCL	Meso- and eutrophic Quercus woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	15
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 34.19 DM: 33.51 DS: 33.93
Operation - Ndep increase (max for site) kg N/ha/yr	0.42
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	2.8
Operation - increase over 0.4 kg N/ha/yr	0.02
Operation - impact extent (ha)	0.46
Operation - impact extent (% of site)	1.91
Operation - impact duration (years until emissions DS = DM at opening yr)	10
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.52.1 Both the DM and the DS are more than double the LCL for meso- and eutrophic woodland, which is 15kg N/ha/yr, at 33.51 and 33.93 kg N/ha/yr respectively. The increase in N deposition (DS-DM) is 0.42kg N/ha/yr, which is 2.8% of the LCL.

The NAA is in the southern part of this AW/SSSI, on calcareous soils, so there is some buffering of the acidification effects of N deposition. The nitrogen-affected area is estimated at 0.46ha in extent (1.9% of the AW block), approximately 40m wide at its widest point and 240m long. The SSSI has been assessed as being in unfavourable recovering condition. The ground flora in the nitrogen-affected area contained some ancient woodland species (e.g., bluebell, butchers broom) but none of the rare or scarce plants listed in the SSSI citation. While there are ancient woodland indicators present in the ground flora, the dense woodland bramble cover appears to be the main factor contributing to unfavourable condition of this SSSI Unit. The only nitrogen sensitive species that was recorded in 2021 was wood sage (EV3) and in 2022 the only species recorded with an EV of 3 was bracken (although wood sage could still be present as the area surveyed was not the same). In 2022, AWI species with EV4, indicating sensitivity to nitrogen included wood anemone, early purple orchid and butcher's broom. Bluebell (EV6), a nitrophile which may respond to nitrogen in moist soil was abundant in the field layer. Dog's mercury (EV7), a nitrophile known to respond to nitrogen, was also abundant in the field layer. No vegetation gradient was observed during survey, with AWI throughout. Cleavers (EV 8) and common nettle (EV 8), both indicators of nutrient enrichment, were infrequent. Other nitrophiles recorded in the transect included ivy (EV6), rare, and bramble (EV6), occasional.

The difference between the DM and DS depositions is 0.42kg N/ha/yr, i.e. 0.02 increase over 0.4, and 2.8% of the LCL. Only a small percentage of the AW site is affected (1.9%). There is a risk that some of the typical woodland species in this small area could be out-competed by species more responsive to increased N deposition and the vegetation composition in this part of the site could change. However, given that the maximum magnitude of increase in N deposition is small and declines with distance from the edge of the site and that the area affected is such a small proportion of the whole site, there is not considered to be an effect on the key characteristics of the site or on site integrity. The duration of impact is estimated at ten years, which is considered temporary and theoretically reversible. The level of impact is therefore assessed as negligible, which results in a slight adverse effect which is not significant.

6.53 Great Crabbles Wood SSSI

Baseline

Table 6.100 Great Crabbles Wood SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	237_SSSI_AW
Resource importance:	National
Overlapping site:	Great Crabbles Wood AW
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	32.98
Site Description - desk study:	The site is designated Great Crabbles Wood SSSI and lies to the north-west of the A229, north of the A229 / M2 interchange (post code DA12 3JU. NGR TQ7025 7000). Most of the SSSI, including the area within 200m of the ARN, is designated AW. The SSSI is notified for its assemblage of vascular plants, which includes lady orchid and man orchid, and broadleaved woodland habitats, which consist of the NVC plant communities W10 Quercus robur-Pteridium aquilinum-Rubus fruticosus woodland and W8 Fraxinus excelsior-Acer campestre-Mercurialis perennis woodland. The SSSI citation describes the site as comprising a series of woodland types arranged north to south across the site and corresponding to geological formations. Acidic gravels form a ridge in the northern part of the wood, beyond 200m of the ARN. This slopes away gradually to the south east, with neutral soils on the upper slope and calcareous sands underlying the southern half of the wood, within 200m of the ARN. Chalk outcrops in the south-east corner. The succession of soils is reflected in the species composition of the tree canopy, shrub layer and ground flora. Dry, open oak-birch woodland with a ground flora of bracken and bramble on the gravels merges with sweet chestnut coppice under oak standards on the damper neutral soils. The oak standards are chiefly pedunculate oak, although sessile oak also occurs, especially on the ridge. Other coppice species present include hornbeam, ash, field maple and hazel, and the ground flora is dominated by dog's mercury and bramble. The woodland on the calcareous sands is similar to that to the north, but the scarce plant bird's foot (Ornithopus

	perpusillus) has also been recorded. A strip of woodland along the southern boundary is dominated by hazel and ash coppice, with some field maple, sweet chestnut and hornbeam coppice under pedunculate oak standards. The shrub layer is varied and includes spindle, wayfaring tree and traveller's joy, which are all characteristic of the calcareous soils. The diverse ground flora is dominated by dog's mercury with ivy and several scarce species are present. These include lady orchid, man orchid, white helleborine, bird's nest orchid, wild liquorice and spurge laurel.
Site Condition - As described in citation/by site manager:	Natural England's SSSI condition assessment for this location (Unit 1, 17 May 2012) states that this site is unfavourable recovering and that 'more open space is needed to meet favourable condition. Tree canopy cover, understorey and volume of dead wood within target. Regeneration of trees occurring - presence of saplings and young trees. Good coverage of native trees, scrub and ground flora. Bluebell, stitchwort, wood sedge, wood anemone, dogs mercury, wood melick, yellow archangel and bramble noted. Some ground disturbance in the East of the Unit was noted'.
Dates surveyed (2021 and 2022):	26/4/2022
Field survey habitat parcel descriptions:	High forest, predominantly W8 (ash - field maple - dog's mercury woodland) with some old sweet chestnut coppice. Appears lightly used by dog walkers and the steep slopes (south-east facing) restricts access. It has an abundance of AWIs throughout.
Lichens:	No lichens present in this woodland, potentially due to the lack of suitable tree species. Oak and birch were rare.
Vegetation gradient:	No vegetation gradient; AWI present throughout NAA.
Notes on active management (field survey observations):	There has been active coppice management of the woodland in areas, however, in the transect, only historic coppice management observed.
Notes on required or beneficial management (field survey observations):	The management should include re-introducing rotational coppicing to produce a greater variety of woodland age diversity and structure.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey recorded minimal recreation pressure and noted some ash die back. NE condition assessment recorded minimal disturbance in east of Unit.
Ellenberg values:	min 3, max 8, mean 5.67

Ellenberg value score 4 and below:	wood anemone 4, silver birch 4, early purple orchid 4, pedunculate oak 4; bracken 3; butcher's broom 4, ragwort 4
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	Moderate (score 30)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Across the four Habitat parcels, nitrophiles which may increase in response to increased nitrogen (Pitcairn et al., 2006) were frequent or abundant in the field layer: ivy EV7, (Habitat parcels 1 and 2), bramble EV6 (Habitat parcels 2, 3 and 4), rough meadow-grass EV6, bluebell EV6 (Habitat parcel 4) and dog's-mercury EV7, (Habitat parcel 4).

Assessment

Table 6.101 Great Crabbles Wood SSSI: Assessment

Habitat used for calculation of LCL	Meso- and eutrophic Quercus woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	15
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 34.19 DM: 33.51 DS: 33.93
Operation - Ndep increase (max for site) kg N/ha/yr	0.42

Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	2.8
Operation - increase over 0.4 kg N/ha/yr	0.02
Operation - impact extent (ha)	0.46
Operation - impact extent (% of site)	1.39
Operation - impact duration (years until emissions DS = DM at opening yr)	10
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.53.1 The increase in N deposition (DS-DM) is 0.42kg N/ha/yr. The site-relevant CL range provided on APIS (CEH, 2022) is 15-20kg N/ha/yr for meso- and eutrophic Quercus woodland and the increase in N deposition is 2.8% of this LCL. Both the DM and the DS are more than double the LCL for this habitat at 33.51 and 33.93 kg N/ha/yr respectively. The increase in N deposition (DS-DM) is 0.42kg N/ha/yr, which is 2.8% of the LCL.

The NAA is in the southern part of this SSSI on calcareous soils, so there is some buffering of the acidification effects of N deposition. The nitrogen-affected area is estimated at 0.46ha in extent (1.4% of the SSSI), approximately 40m wide at its widest point and 240m long. The SSSI has been assessed as being in unfavourable recovering condition. The ground flora in the nitrogen-affected area contained some ancient woodland species (eg. bluebell, butcher's broom) but none of the rare or scarce plants listed in the SSSI citation. While there are ancient woodland indicators present in the ground flora, the dense woodland bramble cover appears to be the main factor contributing to unfavourable condition of this SSSI Unit. The only nitrogen sensitive species that was recorded in 2021 was wood sage (EV3) and in 2022 the only species recorded with an EV of 3 was bracken (although wood sage could still be present as the area surveyed was not the same). In 2022, AWI species with EV4, indicating sensitivity to nitrogen included wood anemone, early purple orchid and butcher’s broom. Bluebell (EV6), a nitrophile which may respond to nitrogen in moist soil was abundant in the field layer. Dog’s mercury (EV7), a nitrophile known to respond to nitrogen, was also abundant in the field layer. No vegetation gradient was observed during survey, with AWI throughout. Cleavers (EV 8) and common nettle (EV 8), both indicators of

nutrient enrichment, were infrequent. Other nitrophiles recorded in the transect included ivy (EV6), rare, and bramble (EV6), occasional.
The difference between the DM and DS depositions is 0.42kg N/ha/yr, ie 0.02 increase over 0.4, and 2.8% of the LCL. Only a small percentage of the SSSI is affected (1.4%). There is a risk that some of the typical woodland species in this small area could be out-competed by species more responsive to increased N deposition and the vegetation composition in this part of the site could change. However, given that the maximum magnitude of increase in N deposition is small and declines with distance from the edge of the site and that the area affected is such a small proportion of the whole site, there is not considered to be an effect on the key characteristics of the site or on site integrity. The duration of impact is estimated at ten years, which is considered temporary and reversible. The level of impact is therefore assessed as negligible, which results in a slight adverse effect which is not significant.

6.54 Great Wood AW

Baseline

Table 6.102 Great Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	240_SSSI_AW
Resource importance:	National
Overlapping site:	Cobham Woods SSSI
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	140.73
Site Description - desk study:	Great Wood AW is classified in the Ancient Woodland inventory for England as ‘ancient and semi-natural woodland’, and most of the AW is part of Great Wood SSSI. The part of Great Wood AW within the NAA lies to the west of the M2 and is within unit 4 of Cobham Woods SSSI.
Site Condition - As described in citation/by site manager:	The area of the SSSI closest to the ARN and potentially affected by N deposition is Unit 4 (Great Wood AW). This unit is adjacent to and overlaps with the M2 motorway and is

	bisected by the HS1 railway (approximately 100-130m wooded width between motorway and railway). SSSI unit 4 (64.64ha) was assessed as 'favourable' condition in May 2013, with the following comment: Woodland structure and natural processes are within target. Woodland has good canopy cover, understorey, open space, dead wood, regeneration and areas of minimum intervention. Species composition is within target, with native species of trees, scrub and ground flora. However, it is unknown what is defined by 'on target' or whether this description applies to the NAA lying to the east of HS1, or to that part of Unit 4 lying to the west of HS1.
Dates surveyed (2021 and 2022):	5/5/21 and 15/6/22
Field survey habitat parcel descriptions:	Abundant old sweet chestnut coppice, slightly more recent in the west of the NAA but very similar. Bramble abundant in the field flora with AWI indicators present. Hornbeam frequent in the canopy with occasional hazel and hawthorn in the understory.
Lichens:	No suitable trees for lichens
Vegetation gradient:	No visible gradient
Notes on active management (field survey observations):	No active management. Abundant old sweet chestnut coppice
Notes on required or beneficial management (field survey observations):	Rotational coppice required to open up the ground layer to light.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Recreation use by the public from Strood reaching the site via an underpass under the M2.
Ellenberg values:	min 3, max 8, mean 5.56
Ellenberg value score 4 and below:	Silver birch 4; wild strawberry 4; creeping soft grass 3; bracken 3; pedunculate oak 4; primrose 4; butcher's broom 4
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	Moderate (score 26)
Limitation(s):	The updated air quality modelling in June 2022 resulted in a larger NAA than was surveyed. Given the survey covered similar habitat, this is not considered a significant limitation.

Habitat sensitivity - Area affected by Ndep:	Habitat parcel 1 had the lowest mean EV value of 5.41 and Habitat parcel 4 had the highest mean EV value of 5.7. Habitat parcel 3 had the highest number (8) of potentially nitrogen sensitive species. Habitat parcels 1 and 2 both had 6 potentially sensitive species. Cleavers, EV 8 an indicator of nutrient enrichment, was not recorded in Habitat parcel 1 and rare in Habitat parcels 2, 3 and 4. Bracken, EV 3, a nitrophobe, was rare in Habitat parcels 1 and 2, and not recorded elsewhere.

Assessment

Table 6.103 Great Wood AW: Assessment

Habitat used for calculation of LCL	Meso- and eutrophic Quercus woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	15
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 62.14 DM: 56.94 DS: 62.09
Operation - Ndep increase (max for site) kg N/ha/yr	5.16
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	34.37
Operation - increase over 0.4 kg N/ha/yr	4.76
Operation - impact extent (ha)	13.12

Operation - impact extent (% of site)	9.32
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.54.1 The DS N deposition is more than triple the upper critical load for meso and eutrophic oak woodland of 20kg N/ha/yr at 62.09kg N/ha/yr and the increase in N deposition (DS-DM) is approximately 34% of the LCL of 15kg N/ha/yr. The site investigation did not record any existing gradient in the vegetation or an abundance of species indicative of nutrient enrichment, despite proximity to the existing motorway. There are nitrogen-sensitive AWI species in the NAA (e.g., wild strawberry, primrose and butcher's-broom) that are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as common nettle are currently infrequent but could increase in cover as a result of increased N deposition.

The area of the site affected (13.12ha) is 9.3% of the site, which forms most of Cobham Woods SSSI Unit 4 (the southern tip of the AW is not designated as SSSI). Unit 4 of the SSSI is already fragmented by the HS1 railway. The designated area of the SSSI includes the railway and part of the M2 motorway and is therefore counted within both the area of designation and in the area affected by N deposition but does not support woodland. The boundary of the AW also overlaps with the motorway but not with the railway. The area of overlap between the AW and the motorway is estimated at 3.16ha, which reduces the area of woodland habitat within the NAA to 9.96ha and to 137.57ha in the AW, meaning that the percentage of the woodland habitat in the AW that is affected by increased N deposition is reduced to an estimated 7.2%.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in this part of the site could change, causing

a possible effect on site integrity. Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of national value could be either large or very large. Given that this site is already fragmented by the HS1 railway, and the precautionary measures adopted throughout the assessment, the resulting effect is assessed as large adverse (significant).

6.55 Hall Wood AW

Baseline

Table 6.104 Hall Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	280_SSSI_AW
Resource importance:	National
Overlapping site:	Langdon Ridge SSSI, Hall/Gravelhill Woods LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	8.06
Site Description - desk study:	The site is designated AW and lies along the west side of the B1007. The site is within unit 9 of Langdon Ridge SSSI (see baseline for SSSI) and is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. Hall AW is also within Hall/Gravelhill Woods LWS. The LWS citation describes Hall Wood as a large ancient wood with a neglected coppice-with-standards structure with hornbeam and hazel under standards of pedunculate oak, hornbeam, ash and wild cherry. Sycamore invasion is well advanced and is in urgent need of control. Open glades are dominated by bracken and bramble, whilst the general ground flora is moderately rich and includes abundant bluebell, wood millet, yellow archangel, wood sorrel, violets and three-veined sandwort. The LWS citation describes that coppicing has recently resumed within the site and that this has benefited the diversity of the site.
Site Condition - As described in citation/by site manager:	The NAA is within SSSI Unit 9. The Natural England web pages give no explanation for the Common Standards Condition Assessment of Unit 9 as 'unfavourable recovering'.

Dates surveyed (2021 and 2022):	06/08/2022
Field survey habitat parcel descriptions:	Very narrow woodland fringe with a ground layer typically dominated by nettle, unlike the extensive, adjacent woodland which currently shows no sign of enrichment. Closest to the road, there is an area of nettle and cleavers with some mallow, hogweed and cocksfoot.
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The LWS citation for Hall/Gravelhill Woods LWS describes Hall Wood as having been invaded by sycamore and this may be exacerbated by active coppice management.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.105 Hall Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N $ha^{-1}yr^{-1}$kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 33.49 DM: 33.1 DS: 33.72
Operation - Ndep increase (max for site) kg N/ha/yr	0.62
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.19
Operation - increase over 0.4 kg N/ha/yr	0.22
Operation - impact extent (ha)	0.09
Operation - impact extent (% of site)	1.14
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.55.1 The increase in N deposition (DS-DM) is 0.62kg N/ha/yr, which is 6.2% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. Hall Wood AW is within Hall/Gravelhill Woods LWS and Langdon Ridge SSSI.

The NAA is a narrow woodland fringe with a ground layer typically dominated by nettle, unlike the extensive, adjacent woodland which currently shows no sign of enrichment. Considering the absence of sensitive species and that the area affected is only 1.1% of the AW, no impact on site integrity is anticipated as a result of an increase in N deposition. However, the time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of national value could be either slight or moderate. Given the absence of sensitive species and the precautionary measures adopted throughout the assessment, the effect is assessed as slight adverse (not significant).

6.56 Hall_Gravelhill Woods LWS

Baseline

Table 6.106 Hall_Gravelhill Woods LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	497_LWS
Resource importance:	County
Overlapping site:	Hall Wood AW, Langdon Ridge SSSI
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	9.91
Site Description - desk study:	The site (NGR TQ678 866) is designated as Hall/Gravelhill Woods LWS (Th53) and lies along the west side of the B1007. The site is within unit 9 of Langdon Ridge SSSI (see baseline for the SSSI) and contains Hall Wood AW. The LWS comprises two adjacent woodlands, the larger Hall Wood to the east of the B1007 and the smaller Gravelhill Wood to the south-west of Hall Wood. The LWS citation describes Hall Wood as a large ancient wood with a neglected coppice-with-standards structure with hornbeam and hazel under standards of pedunculate oak, hornbeam, ash and wild cherry. Sycamore invasion is well advanced and is in urgent need of control. Open glades are dominated by bracken and bramble, whilst the general ground flora is moderately rich and includes abundant bluebell, wood millet, yellow archangel, wood sorrel, violets and three-veined sandwort. Gravelhill Wood has

	Hazel coppice that has been recently re-cut in places, with pedunculate oak and ash standards structure. The ground layer includes abundant bluebell and creeping soft-grass, wood sorrel and wood millet amongst a typical woodland flora. The LWS citation describes that coppicing has recently resumed within the site and that this has benefited the diversity of the site.
Site Condition - As described in citation/by site manager:	Natural England's condition assessment (August 2020) for Unit 9 is unfavourable recovering. Hall Wood/Gravelhill Woods LWS undated citation states: A recent resumption in coppicing has greatly benefited the diversity of the woods and should be continued. However, the recently opened coppice areas will be very susceptible to further Sycamore invasion and this infestation should be treated as a matter of urgency.
Dates surveyed (2021 and 2022):	06/08/2022
Field survey habitat parcel descriptions:	Very narrow woodland fringe with a ground layer typically dominated by nettle, unlike the extensive, adjacent woodland which currently shows no sign of enrichment. Closest to the road, there is an area of nettle and cleavers with some mallow, hogweed and cocksfoot.
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The LWS citation describes the site as having been invaded by sycamore.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A

Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.107 Hall_Gravelhill Woods LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 31.87 DM: 31.59 DS: 32.01
Operation - Ndep increase (max for site) kg N/ha/yr	0.42
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.2
Operation - increase over 0.4 kg N/ha/yr	0.02
Operation - impact extent (ha)	0.14
Operation - impact extent (% of site)	1.38
Operation - impact duration (years until emissions DS = DM at opening yr)	>15

Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.56.1 The increase in N deposition (DS-DM) is 0.42kg N/ha/yr, which is 4.2% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. Hall/Gravelhill Woods LWS is within Langdon Ridge SSSI.
The NAA is a narrow woodland fringe with a ground layer typically dominated by nettle, unlike the extensive, adjacent woodland which currently shows no sign of enrichment. Considering the absence of sensitive species and that the area affected is only 1.4% of the LWS, no impact on site integrity is anticipated as a result of an increase in N deposition. However, the time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the absence of sensitive species and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.57 Halling to Trottiscliffe Escarpment SSSI

Baseline

Table 6.108 Halling to Trottiscliffe Escarpment SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	348_SSSI, 392_SSSI
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	600.58
Site Description - desk study:	Halling to Trottiscliffe Escarpment SSSI (NGR TQ7060 6608 post code: ME2 1EQ) is a large site extending along the North Downs. Some of the SSSI, but not within the NAA, is also designated as North Downs Woodlands SAC. The NAA encompasses Units 39 and 40 of the SSSI. The SSSI citation states that the site is representative of chalk grassland in west Kent and beech woodland on the chalk. Outstanding assemblages of plants and invertebrates are present. A mosaic of habitats is present at this site with areas of grassland, scrub and various types of woodland. The herb rich open downland has a full range of different types of scrub through to ash, yew, and beech woodland, with some oak and hornbeam stands. The chalk grassland is dominated by upright brome and sheep's fescue with dwarf thistle (*Cirsium acaule*), chalk milkwort (*Polygala calcarean)* and several species of orchid including the scarce musk orchid (*Herminium monorchis)* and man orchid. The grassland is the only known location in Britain for the moth (*Hypercallia citrinalis*) and several other very scarce moths, beetles and grasshoppers also occur. Some of the scrub is of entomological interest; an uncommon bug (*Psylla viburni)* which feeds on wayfaring tree has been recorded. The beech and yew woodland ground flora is dominated by dog's mercury, with stinking iris, lady orchid and stinking hellebore. The ground flora of the plateau woodland is quite different with bluebells most abundant. The site supports a wide variety of birds with all three species of woodpecker breeding and hawfinch is present.
Site Condition - As described in citation/by site manager:	The SSSI is large (648 ha). SSSI Unit 40 (7.3ha) lies within the NAA. Natural England last assessed the condition of this unit on 2/12/11 as 'favourable' with the following comment: 'This unit is very inaccessible; a very old pit which has been colonised by scrub and secondary woodland. The interest features are the chalk scrub and chalk flora including orchids at the base of the cliff, which currently require no active intervention. Ravens were reported nesting on the cliff in 2010.' Unit 39 (19.83ha) also lies with the NAA; Natural England last assessed the condition of this unit on 25/11/2011 as 'unfavourable - no change' with the following comment: 'This unit comprises areas of old growth beech, yew and oak but with significant areas of coppice sweet chestnut and hornbeam. It also contains two stands of semi-mature pines interplanted with beech. Fails to meet assessment criteria with regard cover of non-native species and amount of open space (no recent coppicing evident).'
Dates surveyed (2021 and 2022):	18/08/22
Field survey habitat parcel descriptions:	Habitat parcel 1. A young, probably natural, woodland on chalk soils which has not succumbed to the drought conditions maybe due to quite dense canopy. Canopy comprising frequent field maple and ash with clear signs of dieback with occasional hornbeam and oak. Yew is establishing in the understorey which was 2 or 3 metres high. Hawthorn and dogwood are also present in the understorey with large

	well-established clematis. Low growing privet and dogwood are also developing. Sanicle, false wood brome and spurge laurel present in an otherwise closed canopy with ivy dominating the field layer. Habitat parcel 2: A small area of good quality calcareous grassland amongst encroaching scrub at the top of a steep chalk slope. It comprised a good range of calcareous plants including autumn gentian, small scabious, mouse ear hawkweed, quaking grass, carline and dwarf thistle, salad burnet, a species of unidentified orchid, fairy flax and eyebright. It appears to be an unofficial view-point hosting occasional campfires or barbecues thus keeping scrub in check. Habitat parcel 3. Disused chalk quarry site, steep sided and very uneven terrain with steep slopes, gully and hillocks often covered in dense ivy. Sycamore abundant in the canopy with rare ash displaying moderate dieback, and birch, yew and elder understorey. Plenty of AWIs present including sanicle, woodruff, and locally abundant harts tongue fern particularly on bare slopes. Trees are very straight and tall with frequent ivy cover. Yew starting to establish albeit small saplings at present. A series of tracks are sometimes used to dump garden waste and rework or dump soil. Access very difficult because of locked gate which also has a protective function. One slope is an active rubbish dump with significant amounts of rubbish moving down the slope to settle at the base.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient in any of the three Habitat parcels
Notes on active management (field survey observations):	Habitat parcel 1: no active management observed; Habitat parcel 2: location used as unofficial view point, hosting occasional campfires and barbecues, thus keeping the surrounding scrub in check, preventing it from encroaching into the grassland. Habitat parcel 3: no active woodland management observed, but part of slope used to dump rubbish
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: although this is a relatively new growth the woodland already has a dense canopy. Given its closeness to good quality calcareous grassland it could be thinned to create further grassland. Habitat parcel 2: More scrub clearance would allow expansion of the grassland. Habitat parcel 3: remove existing rubbish and prevent more rubbish being dumped here as a priority. Thin sycamore and plant native species.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: woodland canopy is quite dense and will shade out/encroach on the good quality calcareous grassland if left unchecked. Habitat parcel 2: scrub encroachment is a threat to the grassland; Habitat parcel 3: lots of rubbish dumped here; woodland has abundant sycamore, which needs thinning and planting of native species.

Ellenberg values:	Habitat parcel 1: min 4, max 6, mean 5.4; Habitat parcel 2: min 2, max 8, mean 3.85 Habitat parcel 3: min 4, max 8, mean 5.9
Ellenberg value score 4 and below:	Habitat parcel 1: EV4: wild strawberry, pedunculate oak; Habitat parcel 2: EV4: silver birch, *Cotoneaster bullatus* , wall cotoneaster, vipers bugloss, heath bedstraw; wild marjoram, ribwort plantain, white beam. EV3: quaking grass, erect brome, greater knapweed, dwarf thistle, rough hawkbit, hawkweed oxtongue, milkwort, salad burnet. EV2: yellow wort, glaucous sedge, carline thistle, sheep's fescue, autumn gentian, fairy flax, birds foot trefoil, mouse-ear hawkweed, Scots pine and small scabious. Habitat parcel 3: EV4 silver birch and wild strawberry.
Habitat type (UKHab category):	Habitat parcel 1: w1g - Other woodland; broadleaved; Habitat parcel 2: g2a - Lowland calcareous grassland; Habitat parcel 3 w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland): moderate (score 30); Habitat parcel 2 (grassland): good; Habitat parcel 3 (woodland): (score 31)
Limitation(s):	Surveyed in drought conditions
Habitat sensitivity - Area affected by Ndep:	The NAA supports calcareous grassland and woodland habitats with a number of species with low EVs that are potentially sensitive to nitrogen.

Assessment

Table 6.109 Halling to Trottiscliffe Escarpment SSSI: Assessment

Habitat used for calculation of LCL	Broadleaved, mixed and yew woodland (Taxus baccata woodland)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	5
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 84.45 DM: 70.39 DS: 75.84
Operation - Ndep increase (max for site) kg N/ha/yr	5.45
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	109.04
Operation - increase over 0.4 kg N/ha/yr	5.05
Operation - impact extent (ha)	3.22
Operation - impact extent (% of site)	0.54
Operation - impact duration (years until emissions DS = DM at opening yr)	11
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.57.1 Halling to Trottiscliffe Escarpment SSSI is a large site of approximately 600ha. At 75.84kg N/ha/yr, the DS N deposition greatly exceeds the upper critical load for broad-leaved, mixed and yew woodland of 5kg N/ha/yr. The increase in N deposition (DS-DM) is approximately 109% of the LCL of 5kg N/ha/yr.
The NAA is at the north-eastern edge of the site, adjacent to the A228 and overlaps with Units 39 and 40 of the SSSI. Unit 40 includes a disused chalk quarry which was difficult to access.
The site investigation did not record any existing gradient in the vegetation or an abundance of species indicative of nutrient enrichment, despite the high levels of existing and historic N deposition. The NAA supports both woodland and calcareous grassland. There are AWI in the woodland areas such as sanicle and spurge laurel, but these are not considered sensitive to nitrogen. There are numerous species with low EVs in the calcareous grassland that are potentially nitrogen-sensitive, e.g., greater knapweed, dwarf thistle, rough hawkbit, hawkweed oxtongue, milkwort, salad

burnet (all EV3) and yellow wort, glaucous sedge, carline thistle, autumn gentian, fairy flax, birds foot trefoil, mouse ear hawkweed (all EV2). The nitrogen-sensitive species in the NAA are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss.
The area predicted to be affected by N deposition greater than the 0.4kg N/ha/yr screening threshold is 3.22ha. This represents a small proportion (0.5%) of the designation.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 11 years, so is assessed as temporary and theoretically reversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in the affected parts of the site could change. Although the NAA is a small proportion of the site, with most of the sensitive species in an even smaller area of calcareous grassland within it, it is possible that this is a particularly good example of this habitat type within the SSSI. Furthermore, the magnitude of increase in N deposition is very high and it is therefore precautionary to assume there could be an effect on site integrity. However, it is of note that the site is showing signs of other external pressures such as recreation, littering and invasion of scrub that could be exerting more influence on vegetation composition and site condition than N deposition from the adjacent roads.
Therefore, the impact level has been assessed as moderate adverse. The effect of a moderate impact level on a site of national value could be either moderate or large. Given that the NAA is a small percentage of the designation and the precautionary measures adopted throughout the assessment, the resulting effect is assessed as moderate adverse (significant).

6.58 Hillview SINC

Baseline

Table 6.110 Hillview SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	515_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North

Site area (ha):	1.14
Site Description - desk study:	Hillview SINC (TQ573 889) lies along the northern side of the A127. The SINC citation states this is a flower rich grassland and a tiny wood beside the busy A127. According to the citation, the habitats include ancient woodland, hedgerow, semi-improved neutral grassland and unimproved neutral grassland. The citation describes the site as having developed on clay following extraction of material to widen the A127 and supporting grassland rich in common wild flowers such as bird's-foot-trefoil, common knapweed and meadow vetchling, while a clay bank supports frequent cowslip and abundant glaucous sedge. An area of woodland is present adjacent to the A127, described in the SINC citation as a tiny fragment of ancient woodland but not shown in the inventory of Ancient Woodland for England. The woodland is dominated by hornbeam and wild service-tree is present. Elsewhere, boundaries include elm and hawthorn hedges with a treeline of pedunculate oak.
Site Condition - As described in citation/by site manager:	Not provided in citation (last updated 2006)
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A

Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.111 Hillview SINC: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 35.51 DM: 34.44 DS: 37.74
Operation - Ndep increase (max for site) kg N/ha/yr	3.3
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.52
Operation - increase over 0.4 kg N/ha/yr	2.9
Operation - impact extent (ha)	1.14
Operation - impact extent (% of site)	100.0

Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required
Impact level	Moderate adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.58.1 No survey was undertaken in 2022 as access was not granted. The DM and DS N deposition both exceed the critical load range for neutral grassland of 20-30kg N /ha/yr. The increase in N deposition (DS-DM) is 3.3kg N/ha/yr and 16.5% of the LCL. The whole of the site is affected. Review of aerial imagery shows a band of woodland, possibly ancient, adjacent to the A127 and grassland behind. The citation states that the grassland supports species such as bird's-foot-trefoil, common knapweed and meadow vetchling, while a clay bank supports frequent cowslip and abundant glaucous sedge. Given the lack of survey data, it is assumed that sensitive species could be at risk of loss as the more competitive rank grassland species expand at the expense of the more sensitive forb species. Therefore, there could be an effect on the key characteristics of the site or on overall site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as moderate adverse, resulting in a slight adverse effect (not significant).

6.59 Hobbs Hole AW

Baseline

Table 6.112 Hobbs Hole AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	376_AW
Resource importance:	National
Overlapping site:	Hobbs Hole LWS

Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	1.61
Site Description - desk study:	The site is close to the J29 of the M25. Most of the AW is also designated as LWS. The historic map of 1885 shows only about a third of the site as being wooded. The LWS description states that the majority of this woodland is of recent origin, on a non-ancient site. The description states the following: ' Hobbs Hole comprises woodland and scrub habitat. The southern part of the site has tall ash (*Fraxinus excelsior*) coppice and standards in the high canopy. Much of the remainder is dense blackthorn (*Prunus spinosa*) scrub with a ground flora dominated by common nettle (*Urtica dioica*) and red campion (*Silene dioica*). To the north-east side of the small stream channel that runs through the wood is a high canopy with Ash and a mixed shrub layer with hawthorn (*Crataegus monogyna*) and elder (*Sambucus nigra*). In contrast to the species-poor flora of the southern area, the ground flora includes ancient woodland indicators including wood anemone (*Anemone nemorosa*), bluebell (*Hyacinthoides non-scripta*) and moschatel (*Adoxa moschatellina*).'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	24 and 25/05/22
Field survey habitat parcel descriptions:	The woodland was unmanaged high forest, very dense in places. Pedunculate oak and ash were abundant in the canopy with rare aspen and silver birch. The understorey included abundant cherry plum at its southern region, and abundant elder, frequent wild prevent and occasional field maple. Blackthorn was rare. AWI included frequent bluebell, wood millet and three-nerved sandwort, occasional moschatel and rare greater burnet saxifrage and yellow archangel.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No visible gradient. Nettle and cleavers abundant throughout
Notes on active management (field survey observations):	No active management. Where shading is heavier there is a dense cover of ivy and cleavers, but more open areas with abundant nettle are more typical in this habitat.

Notes on required or beneficial management (field survey observations):	Buffering from surrounding land use would be beneficial.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	While retaining some field layer species of ancient woodland, the site appears to be enriched with nutrients, potentially due to the recent origin of much of the tree and shrub cover, previous disturbance, N deposition from nearby roads or dust or other pollution from the industrial area to the north and agricultural land to the east. Most of the site has also been invaded by the non-native cherry plum. Ash dieback may exacerbate these pressures.
Ellenberg values:	min 4, max 9, mean 6.25
Ellenberg value score 4 and below:	Silver birch and pedunculate oak
Habitat type (UKHab category):	w1f7- other lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of Hobbs Wood AW recorded species with every EV between 4 and 9 inclusive. No AWI species with EV 4 or below were present. The nitrophiles cleavers and nettle (EV8) were both abundant in the field layer, and both are indicators of nutrient enrichment Pitcairn et al (2006). Bramble (EV6) was also abundant and is known to respond to increased nitrogen. The following nitrophiles which may increase in response to increased N deposition were frequent in the field layer: bluebell (EV5), cow parsley (EV7); dog's-mercury (EV7), ivy (EV6), rough meadow-grass (EV 6) and wood millet (EV5). The species with the highest EV (9) was greater burdock. The nitrophile herb Robert (EV6) was rare.

Assessment

Table 6.113 Hobbs Hole AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.65 DM: 38.91 DS: 39.57
Construction – impact extent (ha)	0.98
Construction - years where impact exceeds 0.4 kg N/ha/yr	2027, 2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.68 DM: 38.97 DS: 41.04
Operation - Ndep increase (max for site) kg N/ha/yr	2.07
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	20.65
Operation - increase over 0.4 kg N/ha/yr	1.67
Operation - impact extent (ha)	1.42
Operation - impact extent (% of site)	88.24
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.59.1 Most of Hobbs Hole AW is also designated as LWS. During construction, the site is predicted to be affected for two years (2027 and 2028), when the maximum increase in N deposition (DS-DM) is expected to be 0.66kg N/ha/yr (6.6% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr). The extent of the NAA is estimated to be 0.98ha (61% of the site).

During operation, the increase in N deposition (DS-DM) is 2.07kg N/ha/yr and 20.7% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr.

No vegetation gradient was evident and there were no nitrogen-sensitive species present in the ground flora (the only species of EV4 are silver birch and pedunculate oak) and the site appears to be enriched with nutrients, with the nitrophiles cleavers and nettles (EV8) both abundant in the field layer. Bramble (EV6), known to respond to increased nitrogen, was also abundant.

Most of the typical woodland species recorded during the detailed site investigation are nitrophiles which respond to increased N deposition (Pitcairn et al, 2006), such as bluebell, dog's-mercury, bramble, rough meadow grass and wood millet.

The evidence for existing eutrophication, absence of sensitive species and dominance of species such as bramble, cleavers and common nettle, suggests there is unlikely to be a significant change in vegetation composition due to an increase in N deposition. Although 88% of this site is predicted to be affected by increased N deposition during operation, there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. The two years of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.

Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of national value could be either slight (not significant) or moderate (significant). In this case, given the baseline vegetation composition at the site and considering that most of the site is woodland of recent origin and the precautions already adopted in the assessment, it is reasonable to assess the effect as slight adverse (not significant).

6.60 Hobbs Hole LWS

Baseline

Table 6.114 Hobbs Hole LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	82_LWS
Resource importance:	County
Overlapping site:	Hobbs Hole AW
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	2.88
Site Description - desk study:	The site is designated as Hobbs Hole LWS (location NGR TQ587881), most of which is identified on the Ancient Woodland Inventory, although the historic map of 1885 shows about a third of the site being wooded. The LWS description states that the majority of this woodland is of recent origin, on a non-ancient site. It further states the following: 'Hobbs Hole comprises woodland and scrub habitat. The southern part of the site has tall ash (*Fraxinus excelsior*) coppice and standards in the high canopy. Much of the remainder is dense blackthorn (*Prunus spinosa*) scrub with a ground flora dominated by common nettle (*Urtica dioica*) and red campion (*Silene dioica*). To the north-east side of the small stream channel that runs through the wood is a high canopy with Ash and a mixed shrub layer with hawthorn (*Crataegus monogyna*) and elder (*Sambucus nigra*). In contrast to the species-poor flora of the southern area, the ground flora includes ancient woodland indicators including wood anemone (*Anemone nemorosa*), bluebell (*Hyacinthoides non-scripta*) and moschatel (*Adoxa moschatellina*).'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	24 and 25/05/22

Field survey habitat parcel descriptions:	Woodland transect (T1): The woodland was unmanaged high forest, very dense in places. Pedunculate oak and ash were abundant in the canopy with rare aspen and silver birch. The understorey comprised abundant cherry plum and elder, frequent wild prevent and occasional field maple. Blackthorn was rare. AWI included frequent bluebell, wood millet and three nerved sandwort, occasional moschatel and rare greater burnet saxifrage and yellow archangel. Grassland transect (T2): This habitat comprised very rank false oat grass neutral grassland with encroaching nettle, bramble, goat's rue. Nettle was dominant over large areas. Includes an area of dense scrub.
Lichens:	No lichens on suitable trees
Vegetation gradient:	Within grassland (T2): no gradient visible. Rank with nettle dominant throughout, but this may be down to lack of management as much as due to N deposition.
Notes on active management (field survey observations):	There is no active management. The grassland is very rank with encroaching bramble, hemlock, nettle, cleavers and goat's rue.
Notes on required or beneficial management (field survey observations):	The habitat is considered to be nutrient-rich and requiring considerable management to restore it to a more diverse grassland. Woodland creation is suggested to buffer the existing woodland from the effects of the road.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	While retaining some field layer species of ancient woodland, the site appears to be enriched with nutrients, potentially due to the recent origin of much of the tree and shrub cover, previous disturbance, N deposition from nearby roads or dust or other pollution from the industrial area to the north and agricultural land to the east. Most of the site has also been invaded by the non-native cherry plum. Ash dieback may exacerbate these pressures. the grassland supports rank species typical of nutrient-enriched soils.
Ellenberg values:	min 3, max 9, mean 6.23
Ellenberg value score 4 and below:	Woodland transect: with EV 4: silver birch and pedunculate oak. Grassland transect: EV 4: soft brome, oxeye daisy, black medick, ragwort and common vetch; hawkweed EV3, was also present.
Habitat type (UKHab category):	g3c5 - *Arrhenatherum* neutral grassland; w1f7- other lowland mixed deciduous woodland; h3: dense scrub
Habitat condition - area affected by Ndep:	Grassland: poor (meeting none of the criteria)

Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	As Hobbs Wood LWS encompasses Hobbs Wood AW, the same woodland species sensitivities apply to both sites. The grassland contained rough meadow grass, a nitrophile known to respond to increased nitrogen. It also included the nitrophiles bramble EV6, which was abundant and known to respond to increased nitrogen, and nettle EV8 (indicator of nutrient enrichment). Greater burdock had the highest EV (9).

Assessment

Table 6.115 Hobbs Hole LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 41.96 DM: 41.14 DS: 41.88
Construction – impact extent (ha)	2.12
Construction - years where impact exceeds 0.4 kg N/ha/yr	2027, 2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 41.98 DM: 41.25 DS: 43.94
Operation - Ndep increase (max for site) kg N/ha/yr	2.68
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	26.84

Operation - increase over 0.4 kg N/ha/yr	2.28
Operation - impact extent (ha)	2.67
Operation - impact extent (% of site)	92.6
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.60.1 Most of Hobbs Hole LWS is AW and assessed as the AW site. However, the LWS also supports grassland within the NAA. During construction, the site is predicted to be affected for two years (2027 and 2028), when the maximum increase in N deposition (DS-DM) is expected to be 0.79kg N/ha/yr (7.9% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr). The extent of the NAA is estimated to be 2.12ha (74% of the site).

During operation, the increase in N deposition (DS-DM) is 2.68kg N/ha/yr and 26.8% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. The extent of the NAA is estimated to be 2.67ha (93% of the site). There is a small amount of vegetation removal as part of the Project, all of which is in the NAA but this makes no difference to this assessment.

No vegetation gradient was evident and there were no nitrogen-sensitive species present in the woodland ground flora (the only species of EV4 are silver birch and pedunculate oak) and the site appears to be enriched with nutrients, with the nitrophiles cleavers and nettles (EV8) both abundant in the field layer. Bramble (EV6), known to respond to increased nitrogen, was also abundant.

Most of the typical woodland species recorded during the detailed site investigation are nitrophiles which respond to increased N deposition (Pitcairn et al, 2006), such as bluebell, dog's-mercury, bramble, rough meadow grass and wood millet.

The grassland is rank and mesotrophic in nature, undergoing succession to bramble scrub. Hawkweed oxtongue (EV 3) is the only species with that is potentially sensitive to nitrogen, but this species is not a key characteristic of high value grassland, and its loss would not affect the integrity of the grassland habitat in this part of the LWS.

The evidence for existing eutrophication, absence of sensitive species and dominance of species such as bramble, cleavers and common nettle, suggests there is unlikely to be a significant change in vegetation composition due to an increase in N deposition. Although 93% of this site is predicted to be affected by increased N deposition, there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. The two years of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.
Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Considering the assessment of the effect for the AW part of the site is slight adverse (not significant), and by adopting a precautionary approach, it is reasonable to assess the effect on the LWS as slight adverse (not significant).

6.61 Impton_Podkin Wood AW

Baseline

Table 6.116 Impton_Podkin Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	193_AW, 261_AW
Resource importance:	National
Overlapping site:	Frith Woods Etc., Kits Coty LWS
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	21.14
Site Description - desk study:	The site overlaps with Frith Woods etc., Kits Coty LWS and lies along the south side of the M2 extending south west to Warren Road. The two sites differ in that the AW extends further to the north-west (around the crematorium), the LWS includes a large unwooded area in central/eastern area, and the AW does not include a vegetated strip adjacent to the M2 (although the latter may well be a mapping error). The AW is listed on the Ancient Woodland Inventory but has no specific description. The

	overlapping LWS is designated for its 18 hectares of ancient woodland and an unimproved horse grazed pasture. The description states that the site comprises ancient mixed broadleaved woodland on the heavy plateau clays of the North Downs above Bluebell Hill, and unimproved grassland along the north-western edge of the wood. It was formerly managed as coppice-with-standards but is now heavily shaded with over-mature coppice and standards of pedunculate oak. Sweet chestnut coppice is present in parts but mixed coppice of ash, hazel and field maple also occur. Dense hornbeam coppice is also present, particularly at the eastern end. The rides are very damp and shady. The woodland ground flora is dominated by bramble and bluebell but other common woodland herbs including orchids are also present. Sycamore has seeded in at the western end of the site. The soils are more calcareous on the western side and butcher's broom and old man's beard can be seen in this part. The unimproved grassland is heavily horse-grazed grassland, and commoner species characteristic of chalk downland have been recorded, including cowslip, salad burnet, oxeye daisy and bird's foot trefoil, but the grassland is disturbed by heavy grazing.
Site Condition - As described in citation/by site manager:	The LWS description (June 2007) states that the woodland is heavily shaded from overmature coppice and that the rides are damp and shady. It also states that sycamore has seeded in west of the site and that the woodland ground flora is dominated by bramble and bluebell.
Dates surveyed (2021 and 2022):	12/10/21, 06/02/21, 20/07/22
Field survey habitat parcel descriptions:	Habitat parcel 1 (parallel to M2): Established woodland has abundant old sweet chestnut coppice in the canopy with frequent ash, oak standards, and occasional hornbeam. The understorey has frequent hazel, hawthorn, field maple and occasional midland hawthorn. The woodland field layer generally conforms with W10 (oak-bracken-bramble) with abundant bramble and bluebell. The roadside woodland (Quadrat 1) is recently planted (estimated to be 20 years) and included ash, hawthorn, hazel, wayfaring trees and spindle. Many of the young trees still have plastic guards. The AW and roadside woodland are separated by well a used footpath. Habitat parcel 2 (parallel to Warren Road) Old coppiced woodland with abundant canopy sweet chestnut and ash with occasional oak, sycamore, wild cherry, and silver birch. The understorey has abundant hawthorn and frequent hazel. The majority of ground layer is typical of W10 with abundant bramble and bluebell but locally abundant dog's mercury.

Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1 (parallel to M2). Recent woodland adjacent to road: Overgrown, young planted trees with plastic tubing, hazel coppice stools. Gabion reinforced wall on layby; established woodland: no observable management. Habitat parcel 2 (parallel to Warren Road): No active management observed.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1 (parallel to M2), recent woodland: remove tree protectors. Remove litter thrown into the woodland from passing cars. Habitat parcel 2 (parallel to Warren Road): Resume coppicing to increase areas of natural light within woodland; put in place further measures to deter bikes.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1 (parallel to M2): surveyed on 2/6/21 identified 'minimal recreational pressure' along this transect. The LWS description states the LWS was formerly managed as coppice with standards with the woodland now heavily shaded with over-mature coppice and the rides are heavily shaded. Therefore, lack of woodland management appear to be the main threat. The invasive species variegated yellow archangel and cherry laurel were observed. No other pressures or threats were identified during the site investigation. The LWS citation (dated 2007) describes the unimproved grassland (which lies outside the NNA) as being heavily grazed and disturbed and therefore this grassland appears to be managed too intensively to establish species rich calcareous grassland. Habitat parcel 2 (parallel to Warren Road, survey 20/02/22): No active management observed. Area used for biking with resultant disturbance throughout woodland and compaction of soil along trails.
Ellenberg values:	Habitat parcel 1 (parallel to M2, includes recent and established woodland): min 4, max 8, mean 5.65; Habitat parcel 2 (parallel to Warren Road): min 3, max 8, mean 5.85
Ellenberg value score 4 and below:	Habitat parcel 1, (parallel to M2) Species with EV4: silver birch, tufted hair grass, pedunculate oak, and rowan; Habitat parcel 2 (parallel to Warren Road) Species with EV4: silver birch, downy birch, tufted hair grass, smaller cat's tail, pedunculate oak, and common ragwort; Species with EV3: cat's ear.
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland

Habitat condition - area affected by Ndep:	Habitat parcel 1 (parallel to M2), condition assessment for recent woodland between M2 and fence: poor (score 24 points); condition assessment for established woodland moderate (score 29 points). Habitat parcel 2 (parallel to Warren Road) moderate (score 27)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Habitat parcels 1 and 2 recorded species with every EV between 2 and 8 inclusive. Five AWI indicators were recorded in Habitat parcel 1 and five AWI in Habitat parcel 2, none of which were of EV4 or lower. No nitrophobes were present in the field layer of Habitat parcel 1 , and only one was recorded in Habitat parcel 2. A total of ten nitrophiles (Pitcairn et al.,2006) were present in Habitat parcel 1, including abundant bluebell EV6 (may respond to increased nitrogen in moist soils), abundant bramble EV6 (known to respond to increased nitrogen) and frequent hedge woundwort (EV8). Habitat parcel 1 had species of EV8 which may indicate nutrient enrichment: garlic mustard and hedge woundwort. A total of thirteen nitrophiles which may increase in response to increased N deposition were present in Habitat parcel 2, including abundant rough meadow-grass EV6, abundant bramble EV6, occasional to locally abundant dog's mercury EV7, abundant bluebell EV6 and frequent ground ivy EV7. Habitat parcel 2 had indicators of nutrient enrichment with EV8: garlic mustard, hedge woundwort, nettle and cleavers. The mean EV of Habitat parcel 2 (5.85) was higher than the mean EV of Habitat parcel 1 (5.65), and had seven species of EV4 or lower, compared to four species of EV4 or lower in Habitat parcel 1.

Assessment

Table 6.117 Impton_Podkin Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A

Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 0 DM:0 DS:0
Operation - Ndep increase (max for site) kg N/ha/yr	0.0
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	0.0
Operation - increase over 0.4 kg N/ha/yr	-0.4
Operation - impact extent (ha)	1.46
Operation - impact extent (% of site)	6.93
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	M2 Jct3-4 Speed Enforcement, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Negligible adverse
Level of significance	Not significant (after mitigation)
Compensation proposed	Not required

Assessment Rationale

6.61.1 M2 Junction 3-4 mitigation has been applied to this site and as a result there are no air quality transect points where the modelled N deposition is greater than the screening threshold of 0.4kg N/ha/yr. However, modelling results in an impact extent within this site, which is triggered by air quality transect point modelling outside of this AW and the ARN to the west of the site, close to Blue Bell Hill and Verges LWS.
The NAA is in the south-west of the site, adjacent to Wouldham to Detling Escarpment SSSI. This area supports mixed deciduous woodland (UK Habs W1f). A precautionary approach has been applied and a LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been used.

The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation.
Five AWI plant species were identified within the NAA area, all of which are considered likely to respond to increased N deposition (nitrophilic). Of the AWI species recorded, bluebell (EV6) was abundant, and this species may respond to increased nitrogen in moist soils (Pitcairn et al, 2006).
One nitrophobic species (cat's ear, EV3), six species with an EV score of 4 and 13 nitrophilic species were recorded. The nitrophilic species recorded include abundant bramble (EV6, known to respond to increased nitrogen (Pitcairn et al., 2006)) and nettle (EV8, species indicating the presence of nutrient enrichment).
An increase in N deposition may increase the growth of nitrophilic species, including bluebell and bramble, and risk the loss of cat's ear (although this is not a typical woodland species), which may lead to a loss of floristic diversity in the NAA. However, only 6.9% of the total site is likely to be affected and therefore there is unlikely to be an impact on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.62 Ingrebourne Valley SINC

Baseline

Table 6.118 Ingrebourne Valley SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	512_LWS, 513_LWS, 528_LWS
Resource importance:	County
Overlapping site:	The Osiers AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	263.44
Site Description - desk study:	Ingrebourne Valley SINC is a large (262ha) site of Metropolitan Importance. The citation states that it is one of the most natural river corridors in London, with nationally important wetlands at the southern end known as Ingrebourne Marshes. The upper reaches are largely wooded with important ancient alder woods. Large areas of herb-rich grassland are

	also included in the SINC, as are ox-bow ponds and small areas of species-rich fen. The site supports a diverse breeding avifauna, a diverse invertebrate fauna and a population of water voles is present throughout.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	13/07/2022 and 02/07/2022
Field survey habitat parcel descriptions:	Habitat parcel 1: Within the NAA, which has a width of approximately 30m, the habitat comprises mixed scrub with frequent hawthorn, blackthorn and bramble and occasional field maple. A central strip, approximately 7m wide and 80m long and running parallel to the road has been cleared of scrub, excavated and filled with coarse gravel. Habitat parcel 2: Much of this Habitat parcel is neutral grassland with frequent Yorkshire fog, common bent, crested dog's tail and sweet vernal grass. Perennial rye-grass is occasional. Herbs include frequent birds-foot trefoil, rough hawkbit, ragwort, red bartsia and locally frequent yarrow and black knapweed. Much of the grassland is heavily grazed by horses, but the far western end is unmanaged and dominated by false oat grass. Habitat parcel 3: Comprises a mature ash woodland extending from the top of the road embankment down to a stream at the eastern end and grassland to the west. The woodland verge sloping down from the road to a stream is completely unmanaged; it has a good structure with abundant dead wood. Mature Poplar sp. is frequent in the east alongside the abundant to dominant ash over hawthorn and elder with a ground layer often dominated by ramsons, frequent dog's mercury, nettle, and bramble. One AWI, giant fescue was recorded. The western end becomes a narrow band of hawthorn scrub. Habitat parcel 4: This tussocky neutral grassland is grazed by horses but not heavily. It has abundant Yorkshire fog and frequent hairy sedge. Soft rush is occasional. Teasel and meadowsweet locally frequent on an edge of the grassland. The grassland is presumably subject to occasional inundation from the river but wetland species such as meadowsweet are rare. Habitat parcel 5: A strip of woodland gently sloping down to the river from the base of the raised wooded embankment of the dual carriageway (outside the designated site). Ash and oak are frequent in the canopy over an understorey of blackthorn, spindle and elder. The ground layer is dominated by ivy and ramsons away from the river and nettle and ramsons close to the river. The woodland appears to be unmanaged and undisturbed.
Lichens:	Habitat parcels 1, 2, 4 and 5: no lichens; Habitat parcel 3: no lichens on suitable trees.

Vegetation gradient:	Habitat parcels 1, 2, 4 and 5: No vegetation gradient observed; Habitat parcel 3: No sign of a gradient. Nettle frequent but more so at the bottom of the road embankment away from the road, probably due to occasional flooding
Notes on active management (field survey observations):	Habitat parcel 1 contains a cleared and excavated strip possibly for a pipeline or as a means of disposing of aggregate about 7m wide running parallel to the road. There is a further cleared area which as a heap of spoil with ruderals growing over it. Habitat parcel 2: parts of the grassland in the east of the Habitat parcel are heavily grazed and the grassland at the west of the Habitat parcel is homogeneous and appears to be cut annually. Parts of the grassland are used to store waste fences/wooden pallets etc and there is hardcore over part of the ground surface. Habitat parcel 3: no active management observed. Habitat parcel 4: tussocky grassland, grazed by horses, but at low stocking density. Habitat parcel 5: the woodland appears unmanaged.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Allow the regeneration of native species on the gravel path and remove aggressive species such as nettles and thistles along the path, to allow a diversity of 'brown fill' plants to establish. Habitat parcel 2: Remove waste and restore to grassland. Habitat parcel 3: Removal of old fly tipping. Habitat parcel 4: No further measures. Grazing pressure is not so heavy as to prevent flowering; Habitat parcel 5: selectively clear some of the locally dominant ivy and nettles to allow less competitive woodland species to grow. Selectively thin the woody species to allow more light to reach the woodland field layer.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: the intentions for cleared strip are unknown i.e., whether it will remain clear of vegetation or whether vegetation will be allow to regenerate and then be managed. Habitat parcel 2 (grassland): Development is taking place within the central part of this Habitat parcel. Some of the grassland appear overgrazed by horses and rabbits; at the west of the Habitat parcel is an area used to store waste - dilapidated wooden pallets, fences and planks, and area of hard core at ground level. Habitat parcel 3: Signs of historical clay pigeon shooting indicating the area used to be much more open. During the survey a rusting oil barrel was found and tyres were dumped in the stream at the eastern end of the Habitat parcel. Habitat parcel 4: cessation of current grazing regime. Habitat parcel 5: ash dieback; Himalayan balsam along the riverbank.

Ellenberg values:	Habitat parcel 1: min 4, max 8, mean 6.25; Habitat parcel 2: min 2, max 9, mean 5.55; Habitat parcel 3: min 3, max 8, mean 6.16; Habitat parcel 4: min 3, max 9, mean 5.8; Habitat parcel 5: min 4, max 8, mean 6.37
Ellenberg value score 4 and below:	Habitat parcel 1: Pedunculate oak, EV4; Habitat parcel 2: 11 species with EV4: yarrow, common bent, crested dog's tail, Autumn hawkbit, smaller cat's tail, ribwort plantain, selfheal, fleabane, pedunculate oak, meadow buttercup and ragwort; 2 species with EV3: sweet vernal grass and rough hawksbit; and common bird's foot trefoil EV2. Habitat parcel 3: 2 species of EV4, common bent and pedunculate oak; one species of EV3, sweet vernal grass. Habitat parcel 4: 5 species with E4: yarrow, soft rush, ribwort plantain, meadow buttercup, and common ragwort; 2 species of EV3: sweet vernal grass and cat's ear; Habitat parcel 5: EV4 pedunculate oak.
Habitat type (UKHab category):	Habitat parcel 1: h3h - Mixed scrub; Habitat parcel 2: g3c - Other neutral grassland; Habitat parcel 3: w1g - Other woodland; broadleaved; Habitat parcel 4: g3c - Other neutral grassland; Habitat parcel 5: w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Habitat parcel 1 (scrub): moderate; Habitat parcel 2 (grassland) good; Habitat parcel 3 (woodland): moderate (score 30); Habitat parcel 4 (grassland) moderate; Habitat parcel 5: (woodland) moderate (score 28)
Limitation(s):	Habitat parcels 1 and 2, no limitation; Habitat parcel 3: The River Ingrebourne makes accessing the eastern end very difficult - surveyors needed to go round the stream. The eastern section was inaccessible due to dense vegetation. Habitat parcel 4: On the day of survey (11 August 2022) the sward was so dry and dead that it is likely some species were under-recorded. Habitat parcels 4 and 5: the river was too broad to cross to it was not possible to survey the grassland/woodland for a distance of approximately 50 metres to its west.
Habitat sensitivity - Area affected by Ndep:	Survey of the five Habitat parcels recorded species with every EV between 2 and 8 inclusive. Overall, eighteen nitrogen sensitive species of EV4 or less were recorded, including fourteen species with EV4, two with EV3 and one with EV2. Habitat parcel 2 (grassland) had the highest number of nitrogen sensitive species (14 species). One AWI, giant fescue (EV3) was recorded in Habitat parcel 3. This species is a nitrophile and may respond to increased nitrogen (Pitcairn et al.,2006). One nitrophobe was recorded, sweet vernal grass, EV3 (in Habitat parcel 3). Across the five Habitat parcels, the following nitrophiles (Pitcairn et al.,2006), which may increase in response to increased N deposition were frequent to dominant: ivy, EV6 (in Habitat parcels 3 and 5), bramble, EV6 (in Habitat

	parcels 1, 3 and 4), nettle EV8 (in all Habitat parcels), dog's mercury, EV6 (in Habitat parcel 3) and Yorkshire fog, EV5, (in Habitat parcels 2 and 4). Of the five Habitat parcels of this site, Habitat parcel 3 had the lowest mean EV value of 5.55 and Habitat parcel 5 had the highest mean EV value of 6.37.

Assessment

Table 6.119 Ingrebourne Valley SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 29.66 DM: 28.65 DS: 29.98
Operation - Ndep increase (max for site) kg N/ha/yr	1.33
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	13.3
Operation - increase over 0.4 kg N/ha/yr	0.93
Operation - impact extent (ha)	10.25
Operation - impact extent (% of site)	3.89

Operation - impact duration (years until emissions DS = DM at opening yr)	11
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.62.1 Ingrebourne Valley SINC is a large site, consisting of multiple blocks of woodland, grassland and river corridor. Because the SINC is a large site made up of multiple blocks, there are several NAAs supporting neutral grassland and lowland mixed deciduous woodland. A precautionary LCL (10kg N/ha/yr) has been used for broadleaved deciduous woodland. The maximum increase in N deposition (DS-DM) is 1.33kg N/ha/yr and 13.3% of the LCL or broadleaved deciduous woodland. There was no observable vegetation gradient in any of the surveyed blocks and no lichens on suitable trees were identified.

There are two NAAs in the northern part of the SINC, adjacent to the M25. No access was granted in 2022 to this part of the site but aerial imagery indicates that the most northern NAA is predominantly grassland and the NAA to the south of this supports woodland. Surveys were carried out on the part of the site either side of the A127, further to the south. Habitats here included scrub, woodland and neutral grassland. Some degradation was noted, particularly to the north of the A127, where there has been vegetation clearance and storage of waste.

During the surveys, 18 nitrogen sensitive species of EV4 or less were recorded. The neutral grassland in Habitat parcel 2 had 14 nitrogen sensitive species but most of the grassland appears to be quite rank and mesotrophic in nature. In woodland to the north of the A127, the only AWI recorded was giant fescue (EV3). This species is a nitrophile and may respond to increased nitrogen Pitcairn et al (2006). Across the survey area, nitrophiles which are more typical of fertile conditions (EV 6-8) were frequent to dominant, including ivy, bramble and nettle in woodland areas and Yorkshire fog in the grasslands. These species may further increase under increased N deposition.

It is estimated that 10.25ha (3.9%) of the total site is likely to be affected by N deposition increase above the 0.4kg N/ha/yr screening threshold. It is of note that the DS N deposition is within the critical load range of neutral grassland (20-30kg N/ha/yr). The NAA comprises both grassland and woodland habitats and an overall impact on site integrity is considered unlikely. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 11 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county or metropolitan value could be either neutral or slight.

Given the range of habitats within the SINC and that the NAA is a small percentage of the designation, together with the precautionary measures adopted throughout the assessment, the resulting effect is assessed as neutral (not significant).

6.63 Jermains Wood SINC

Baseline

Table 6.120 Jermains Wood SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	514_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	7.28
Site Description - desk study:	Jermains Wood SINC is of Borough Grade II importance within Greater London. The description summary (31/06/2005) states that it is 'an ancient wood with a good range of plants and animals. Ancient woodland and running water.' The site description is as follows: 'This site is an area of probably ancient woodland with a good flora. Ash (*Fraxinus excelsior*) is dominant in the majority of the wood, much of which is suffering from die-back. Areas of mature hornbeam (*Carpinus betulus*) coppice occur in the north, whilst the western part (known as Wormwalk Shaw) contains more oak (*Quercus sp.*) and hazel (*Corylus avellana*), with a field layer of bracken (*Pteridium aquilinum*) and bluebell (*Hyacinthoides non-scripta*). The ground flora over the remainder of the wood also contains frequent bluebell, together with species such as dog's mercury (*Mercurialis perennis*), ground ivy (*Glechoma hederacea*) and occasional moschatel (*Adoxa moschatellina*). There are several glades within the wood and a mown ride runs through the centre, both enhancing the wood as invertebrate habitat. An old woodland ditch and bank runs along the western boundary, topped by large oak and hornbeam trees and there is a stream along the southern boundary.

	A large area in the middle of the wood has been felled and re-stocked. Breeding birds include hobby and sparrowhawk.'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	11/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1. Young mixed scrub with many tall herb glades. Dogwood, hawthorn and bramble predominate with fleabane and great willowherb abundant in the glades. Habitat parcel 2: W8 Ash woodland with abundant ash and hornbeam, frequent pedunculate oak and sycamore in the canopy. English elm, hazel, field maple, blackthorn and wild privet are frequent in the understorey. The ground layer is dominated by dog's-mercury, with frequent bluebell.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Habitat parcel 1: no active management observed. Habitat parcel 2: An open area to the north with scattered ash appears to have been subjected to recent felling / coppicing with some replanting. No other signs of recent management or disturbance.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Maintain the existing glades and rides by selective clearance of competitive species. The habitat is in a state of natural succession and offering a good range of habitats, also some areas to develop by natural succession, without intervention. Habitat parcel 2: No additional measures recommended in areas of existing tree felling, although ash dieback may result in further need for replanting. Remove tree guards which are still on trees. Thin/coppice in densely shaded parts of the woodland.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: Ash dieback; glades are becoming overgrow. Habitat parcel 2: ash die back; some woodland areas are too densely shaded and require management.
Ellenberg values:	Habitat parcel 1: min 3, max 8, mean 6.03; Habitat parcel 2: min 4, max 8, mean 6.13
Ellenberg value score 4 and below:	Habitat parcel 1: EV4: fleabane; pedunculate oak. EV3: hawkweed oxtongue; European gorse Habitat parcel 2: EV4: pedunculate oak

Habitat type (UKHab category):	Habitat parcel 1: h3h - Mixed scrub; Habitat parcel 2: w1g - Other woodland; broadleaved.
Habitat condition - area affected by Ndep:	Habitat parcel 1 (scrub) moderate; Habitat parcel 2 (woodland): good
Limitation(s):	Surveyed during summer drought when much of the field layer vegetation was very dry/dead.
Habitat sensitivity - Area affected by Ndep:	Survey of the two Habitat parcels recorded species with every EV score between 3 and 8 inclusive. Overall, four nitrogen sensitive species of EV4 or less were recorded, including two species with EV4 and two species with EV3. One AWI was recorded in the field layer, pendulous sedge, EV6, which is not considered to be sensitive to nitrogen. No nitrophobes were recorded. Across the two Habitat parcels three nitrophiles were frequent to abundant in the field layer: bramble, EV6 (in Habitat parcel 1), bluebell, EV6, (in Habitat parcel 2), and dog's mercury, EV7 (in Habitat parcel 2). Bramble and dog's mercury are known to respond to increased nitrogen and bluebell may respond to increased nitrogen in moist soils (Pitcairn et al.,2006). Other nitrophiles occurring with a frequency of occasional or rare are Yorkshire fog, EV5, false oat grass, EV7, common nettle, EV8, which is an indicator of nutrient enrichment.

Assessment

Table 6.121 Jermains Wood SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.23 DM: 52.27 DS: 52.76
Operation - Ndep increase (max for site) kg N/ha/yr	0.68
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.76
Operation - increase over 0.4 kg N/ha/yr	0.28
Operation - impact extent (ha)	1.29
Operation - impact extent (% of site)	17.73
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.63.1 The increase in N deposition (DS-DM) is 0.68kg N/ha/yr. Site survey indicates that the part of the NAA adjacent to the M25 supports mixed scrub and glades of tall herbs which grades into woodland further into the site. The increase in N deposition is 6.8% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. No AWI indicator species with EV values of 3 or 4 were recorded. The only species with EV 3 was hawkweed oxtongue, which is not a typical woodland species. Nitrophiles were frequent to abundant in the field layer, including bramble (EV6), bluebell, (EV6) and dog's mercury (EV7) (in Habitat parcel 2). Bramble and dog's mercury are known to respond to increased nitrogen and bluebell may respond to increased nitrogen in moist soils (Pitcairn et al.,2006). Other nitrophiles occurring with a frequency of occasional or rare are Yorkshire fog (EV5), false oat grass (EV7) and common nettle (EV8), which is an indicator of nutrient enrichment. The absence of sensitive AWI species and frequently recorded nitrophiles such as bramble (EV6), ivy (EV7) and nettle (EV8), suggests there is unlikely to be an observable change in vegetation composition due to an

increase in N deposition and no risk of loss of sensitive species. Considering the species composition and area affected (17.7% of the site), there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the absence of sensitive species and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.64 Langdon Ridge SSSI

Baseline

Table 6.122 Langdon Ridge SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	280_SSSI_AW, 281_SSSI_LWS, 385_SSSI, 386_SSSI, 656_SSSI, 93_SSSI
Resource importance:	National
Overlapping site:	Hall Wood AW, Hall/Gravelhill Woods LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	345.09
Site Description - desk study:	Langdon Ridge SSSI is a large site that lies along both sides of the B1007 (location NGR: TQ688 880). The SSSI is notified for its diverse complex of species-rich neutral grasslands, fen meadows, ponds, scrub and ancient and long-established semi-natural woodland habitats, for assemblages of invertebrates chiefly associated with open short sward and scrub-heath and for populations of the plant Deptford pink. The habitats comprise the NVC plant communities MG5 *Cynosurus cristatus-Centaurea nigra* grassland, M22 *Juncus subnodulosus-Cirsium palustre* fen meadow, W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland and W21 *Crataegus monogyna-Hendra helix* scrub.
Site Condition - As described in citation/by site manager:	The NAA lies within SSSI Units 8, 9, 10 and 21 of Langdon Ridge SSSI. All these Units were assessed by Natural England on 06/08/20 to be in 'unfavourable recovering' condition,

	although no further information was provided. Units 8 and 9 of Langdon Ridge SSSI lie along the west side of the B1007 and are the only Units included in the 2022 air quality assessment. Unit 9 is a large unit and also includes Hall/Gravelhill Woods LWS and Hall Wood AW. Unit 10 lies within Westley Heights LWS while Unit 21 lies within The Park/Coombe Wood LWS.
Dates surveyed (2021 and 2022):	04/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1: This was a strip of neglected woodland which was mainly inaccessible. The canopy had abundant ash, occasional pedunculate oak with rare hybrid oak. The understorey had frequent hawthorn with occasional sycamore, holly and elder. The field layer had frequent bramble and ivy, with occasional cleavers, common nettle and wood avens. One AWI, spindle, was recorded in the field layer. The Habitat parcel had scattered litter. No browsing or other damage was observed. Habitat parcel 2: Bramble was abundant in the northern and southern sections of Habitat parcel 2, while bracken was abundant in the middle section. Competitive forbs, coarse grasses and common nettle grew around the edges of the bramble and bracken. Habitat parcel 3: The NAA was within a dense semi mature plantation woodland on a slope upwards from the road which had abundant ash and pedunculate oak in the canopy. Hawthorn and hornbeam were frequent in the understorey. The field layer had low species diversity and included locally abundant bramble and bluebell (rare) where there was more light towards the road edge. Habitat parcel 4: False oat-grass was abundant along the roadside bank for approximately 30m in the northern section of this Habitat parcel, while dense bramble scrub was abundant along the bank for approximately 55m in the Habitat parcel's southern section. Along the bank were occasional scattered sapling ash and young ash, and a young sycamore. Habitat parcel 5. Mature high forest with abundant oak and frequent sycamore over hazel. The woodland has a diverse age structure. The ground layer had dominant bramble and nettle across the survey area, but nettle becomes much less frequent and dense bramble occurs only in patches in the wider woodland. No AWIs were noted within the survey area, but some were noted in the wider woodland such as abundant bluebell and occasional wood millet. The woodland appears to be largely unmanaged with abundant dead wood. It seems popular with dog walkers but no evidence of negative impacts.
Lichens:	No lichens on suitable trees; Habitat parcel 5: Some lichens especially *Xanthoria sp* present on oaks at edge of the woodland, but lichens absent further into the woods, due to shading.

Vegetation gradient:	Habitat parcels 1, 2, 3, 4: no vegetation gradient observed; Habitat parcel 5: Apparent gradient between the survey area where nettle is very abundant and the wider woodland where it is much less frequent. Nettle is especially abundant immediately adjacent to the road.
Notes on active management (field survey observations):	Habitat parcel 1, 2 and 5: No active management observed; Habitat parcel 3: no active management of dense plantation on the bank; Habitat parcel 4: no management observed
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Remove non-native shrubs. Thin the canopy by removing some sycamore. Habitat parcel 2: control/remove bracken in central section of Habitat parcel; Habitat parcel 3: thin the plantation, which is currently very dense; Habitat parcel 4: where control of the bramble scrub is required on its road facing side, trim it outside the bird nesting season and after the berries have stopped providing food for birds. Cut the false oat grass twice a year, once in late autumn and once at the start of spring, to increase the diversity of flowering plants. Habitat parcel 5: Suggest laying a hedge parallel to the road to buffer the wood from the road.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: lack of woodland management; rubbish; Habitat parcel 2: Central section of Habitat parcel with dominant bracken; Habitat parcel 3: ash dieback; Habitat parcel 4: none observed; Habitat parcel 5: ash dieback; oak processionary moth. Litter.
Ellenberg values:	Habitat parcel 1: min 4, max 8, mean 6.19; Habitat parcel 2 min 3, max 8, mean 5.94; Habitat parcel 3: min 3, max 8, mean 5.61; Habitat parcel 4: min 4, max 8, mean 5.93; Habitat parcel 5: min 3, max 8, mean 6.26
Ellenberg value score 4 and below:	Habitat parcel 1: EV4: Pedunculate oak; Habitat parcel 2: EV4: yarrow and pedunculate oak; EV3: bracken; Habitat parcel 3: EV4: pedunculate oak, common whitebeam; EV3: creeping soft grass and bracken; Habitat parcel 4: yarrow, ribwort plantain and pedunculate oak. Habitat parcel 5: EV4: pedunculate oak; EV3: bracken
Habitat type (UKHab category):	Habitat parcel 1: w1g - Other woodland; broadleaved; Habitat parcel 2: h3d - Dense bramble scrub and g1c - bracken; Habitat parcel 3: w1g - Other woodland; broadleaved; Habitat parcel 4: h3d - Bramble scrub and g3c - other neutral grassland; Habitat parcel 5 w1f7 - Other Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1: moderate (score 29); Habitat parcel 2 (bramble scrub): poor; Habitat parcel 3 (woodland) moderate (score 26); Habitat parcel 4 (bramble scrub): moderate; Habitat parcel 5 (woodland) moderate (score 29)

Limitation(s):	Habitat parcel 1 was largely inaccessible and viewed from the road. No other limitations.
Habitat sensitivity - Area affected by Ndep:	Habitat parcel 1 had the lowest mean EV value of 6.03 and Habitat parcel 2 had the highest mean EV value of 6.13. Habitat parcel 1 also had the highest number of nitrogen sensitive species, four species, while Habitat parcel 2 had one nitrogen sensitive species of EV4.

Assessment

Table 6.123 Langdon Ridge SSSI: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 33.49 DM: 33.1 DS: 33.72
Operation - Ndep increase (max for site) kg N/ha/yr	0.62
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.19
Operation - increase over 0.4 kg N/ha/yr	0.22
Operation - impact extent (ha)	0.68
Operation - impact extent (% of site)	0.2

Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.64.1 The maximum increase in N deposition (DS-DM) is 0.62kg N/ha/yr, which is 6.2% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. The NAA of the SSSI is within Units 8 and 9 of the SSSI and overlaps with Langdon Complex LWS, Hall Wood AW and Hall/Gravelhill Woods LWS, with the highest increase in N deposition predicted within the part that overlaps with Hall Wood AW.
The NAA is a narrow strip along the B1007. It comprises woodland with abundant bramble, ivy and bracken, bramble scrub and rank grassland along the roadside, which is dominated by false oat-grass. The only AWIs recorded were spindle and bluebell, neither of which are considered at risk of loss due to increased N deposition.
Given the absence of sensitive species and that the area affected is only 0.2% of the SSSI, no impact on site integrity is anticipated as a result of an increase in N deposition. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. However, the current vegetation composition along the edge of the woodland is such that no observable change is anticipated. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6.65 Lea Valley SINC

Baseline

Table 6.124 Lea Valley SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	586_LWS
Resource importance:	County

Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	947.28
Site Description - desk study:	GiGL's summary citation for Lea Valley SINC states: This sprawling series of open spaces, in the valley of the River Lea, includes lakes, reservoirs, marshes and wet grassland. The wonderfully diverse range of wetland habitats has made this area a haven for many rare plants and a tremendous range of birds.
Site Condition - As described in citation/by site manager:	Not provided in citation
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A

Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.125 Lea Valley SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 57.98 DM: 57.15 DS: 57.84
Operation - Ndep increase (max for site) kg N/ha/yr	0.7
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.96
Operation - increase over 0.4 kg N/ha/yr	0.3
Operation - impact extent (ha)	0.36
Operation - impact extent (% of site)	0.04

Operation - impact duration (years until emissions DS = DM at opening yr)	2
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.65.1 No survey was undertaken in 2022 as access was not granted. However, the lack of survey information is not considered to affect the outcome of the assessment, given the extremely limited extent of the NAA, which is a strip of maximum 10m along the northern edge of the SINC, where it abuts the M25. Some of the modelled NAA appears to extend outside the SINC boundary, and therefore the area affected is even smaller than estimated. The maximum extent of the NAA is estimated at 0.36ha, which is approximately 0.04% of the site.
The modelling was undertaken using an assumption that the most sensitive habitat present was deciduous broadleaved woodland habitat with a LCL of 10kg N/ha/yr. Aerial imagery indicates that the boundary of this part of the site is mainly wooded. The increase in N deposition (DS-DM) is 0.70kg N/ha/yr, which is 7% of this LCL. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 2 years, so is assessed as a temporary and theoretically reversible. Given the negligible proportion of the site affected and the short duration of increase in N deposition, there is predicted to be no change in vegetation composition and no impact on the integrity of the site. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6.66 Leybourne Lakes Etc., Snodland LWS

Baseline

Table 6.126 Leybourne Lakes Etc., Snodland LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	463_LWS, 464_LWS, 465_LWS, 483_LWS
Resource importance:	County

Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	119.96
Site Description - desk study:	The description states that the lakes support four recently recorded county rare or scarce plant species and others may still be present. They are also used by at least 100 bird species (recent KOS survey) and regularly by over 60 wintering species including bittern and some uncommon animals such as water vole. The NAA is included within Leyboune Lakes Country Park, and is shown on the map accompanying the description as lying along the northern bank of Sand Pond or Lake 2. Common bladderwort and water violet are present in lake 2, both of which are listed as County Scarce species in the Atlas of Kent Flora. The management plan for this sites states that 'Sand Pond' is the smallest and shallowest lake on the site. It forms the western part of a complex of water bodies of similar character which are located adjacent to the A228 bypass immediately outside the site. The northern and southern edges of the lake are shaded by overhanging goat and crack willow (*Salix fragilis*). The lake has diverse aquatic and emergent vegetation including common reed, greater reedmace (*Typha latifolia*), amphibious bistort (Habitat *parcelum amphibium*), common club rush (*Scirpus lacustus*), unbranched bur reed (*Sparganium emersum*), water horsetail and marsh horsetail (*Equisetum fluviatile* and *E. palustre*), water starwort (*Callitriche sp.*), brooklime (*Veronica beccabunga*) and toad rush (*Juncus bufonius*). Other plants surrounding the water's edge include creeping bent (*Agrostis stolonifera*), marsh cudweed (*Gnaphalium uliginosum*), redshank (Habitat *parcelum persicaria*), wild lettuce (*Lactuca serriola*) and Canadian fleabane (*Conyza canadensis*).
Site Condition - As described in citation/by site manager:	There is a management plan for Leybourne Lakes Country Park, for the period 2017 to 2021. In reference to this management plan, the NAA lies within Compartment 3 and along the vegetated northern bank of Sand Pond, one of the fishing lakes. The plan states that the northern and southern edges of this pond are shaded by overhanging goat and crack willow, that these lakes are managed to maintain the lakes high wildlife value and that the fisheries are managed under licence.
Dates surveyed (2021 and 2022):	29/06/2022

Field survey habitat parcel descriptions:	The canopy comprised occasional sycamore and sweet chestnut, and ash was rare. Ground layer had dominant ivy with frequent brambles and common nettles. Cleavers was rare. Access was only possible for a few feet into the west of the NAA due to a steep bank and dangerous ditch.
Lichens:	No suitable trees.
Vegetation gradient:	No observable gradient
Notes on active management (field survey observations):	No management observed.
Notes on required or beneficial management (field survey observations):	None recorded
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Leybourne Lakes Management Plan lists a number of pressures (page 42). The most relevant to Sand Pond and the NAA appears to be grassland becoming overgrown with scrub and trees as well as pollution and bank erosion.
Ellenberg values:	min 5, max 8, mean 6.0
Ellenberg value score 4 and below:	None
Habitat type (UKHab category):	w1g - other woodland, broadleaved
Habitat condition - area affected by Ndep:	Poor (score 22)
Limitation(s):	Access was only possible for a few feet into the west of the NAA due to a steep bank and dangerous ditch beside a lake.
Habitat sensitivity - Area affected by Ndep:	Only ten species were recorded, due to the difficulty of accessing this site. The wooded bank includes sycamore EV6, and sweet chestnut EV5, and these are not listed as either nitrophiles or nitrophobe by Pitcairn et al (2006). The bank included the following nitrophiles: frequent bramble, EV6 which is known to respond to increased nitrogen, dominant ivy EV 7, and frequent common nettle, EV8, an indicator of nutrient enrichment.

Assessment

Table 6.127 Leybourne Lakes Etc., Snodland LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 28.99 DM: 27.2 DS: 27.65
Operation - Ndep increase (max for site) kg N/ha/yr	0.45
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	2.25
Operation - increase over 0.4 kg N/ha/yr	0.05
Operation - impact extent (ha)	0.33
Operation - impact extent (% of site)	0.27
Operation - impact duration (years until emissions DS = DM at opening yr)	10
Mitigation proposed	Not required
Impact level	No change

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.66.1 The increase in N deposition (DS-DM) is 0.45kg N/ha/yr and 2.3% of the LCL. Only 0.3% of the site is predicted to be affected by increased N deposition and most of this is within the wetland area (Sand Pond), which is not sensitive to nitrogen. The site investigation did not record any existing gradient within the terrestrial habitat adjacent to Sand Pond, and the field layer is dominated by robust species that are not sensitive to increased nitrogen, such as ivy (EV 6), bramble (EV 6) and common nettle (EV 8).
Given the absence of sensitive species and that the key reason for designation of the site is the wetland habitat (which is not sensitive to nitrogen), it is considered that there will be no observable impact on vegetation composition and no effect on the integrity of the site.
Overall, the impact level is assessed as no change, which results in a neutral effect (not significant).

6.67 Linford Pit LWS

Baseline

Table 6.128 Linford Pit LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	324_LWS, 324b_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	14.27
Site Description - desk study:	Linford Pit LWS (location NGR: TQ 668802, post code SS17 0PJ) description states: This brownfield site supports an important invertebrate fauna and lies within a very significant

	cluster of such sites. The invertebrate fauna includes several nationally rare (Red Data Book) species, including the bees (*Andrena flora*) and (*Nomada fulvicornis*) (both RDB3), and the wasps (*Cerceris quinquefasciata*) (RDB3 and a national BAP species) and (*Hedychrum niemelai*) (also RDB3), as well as several nationally scarce spiders and the nationally rare fly (*Myopa polystigma)* (RDB3). Selection Criteria: SCr11; SCr12 [species criteria]
Site Condition - As described in citation/by site manager:	Under 'Condition and Proposed Management' the undated LWS description states that 'the Site is suffering from extremes of management pressure. In some areas the land is completely undisturbed and scrub woodland is developing, which will shade out the areas of interest for invertebrates. In other places, very heavy use by motorbike scramblers is causing too much disturbance. Such recreational pressure would not necessarily be a bad thing, if more diffusely applied over more of the site'. Aerial imagery shows dense scrub and areas used by motorcycles at least from 1999 to the present 2021.
Dates surveyed (2021 and 2022):	10/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1. Mature secondary woodland, apparently unmanaged, high forest. Except for a few areas it does not have the appearance of plantation, but the exotic mix of species throughout strongly indicates it is, with abundant grey alder and occasional to locally abundant Italian alder, locally abundant grey poplar and occasional sweet chestnut and false- acacia in the canopy, together with frequent silver birch and occasional alder and pedunculate oak. Elder is frequent in the understorey but almost completely wilted and brown due to the drought on the day of survey (10 August 2022). The ground layer is dominated by nettle and cleavers in the north and dense bramble towards the south. Habitat parcel 2. Broadleaved plantation woodland, but a more native mix than the woodland to the north, including some oaks which are markedly older than the planted trees. Most trees and shrubs appear to have been planted about 30 years ago. Pedunculate oak is abundant in the canopy together with frequent cherry and occasional silver birch. In the understorey hawthorn and coppiced hazel are frequent and occasional field maple and the ground layer consists of frequent bramble, wood avens, common bent and Yorkshire fog. Habitat parcel 3. Tall herb colonising a series of spoil heaps with frequent false oat grass, but largely dominated by hemlock, with frequent to abundant spear thistle, creeping thistle, hedge mustard, teasel, nettle and goat's rue. A few more recently disturbed areas are more sparsely vegetated with frequent Canadian fleabane, narrow-leaved ragwort and rare common cudweed. Habitat parcel 4. A band of dense mixed scrub adjacent to an active

	quarry with abundant bramble, dogwood and buddleia and locally abundant aspen saplings. Surveyed from a distance.
Lichens:	No lichens
Vegetation gradient:	No vegetation gradients observed.
Notes on active management (field survey observations):	Habitat parcel 1: Some trees have tags and there are some wooden stakes in the ground. Some clearance work has occurred on the northern boundary. Habitat parcel 2: No signs of recent management, although planted hazel has been coppiced once and many trees still have their guards on. Habitat parcel 3: There are excavation works, over 2m deep, at the north of the Habitat parcel and the site has felt mats such as are used for reptile survey. Habitat parcel 4: no management observed.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Thinning out of non-native trees. Habitat parcel 2: thin trees, remove tree guards. Habitat parcel 3: Clearance of some of the tall herb ruderal vegetation, particularly on the south facing bank, to create bare areas for invertebrates. Habitat parcel 4: Naturally developing mixed scrub, in a state of succession. Remove some scrub, particularly the invasive buddleia, to create bare ground for invertebrates.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The woodland in Habitat parcels 1 and 2 is largely unmanaged and requires management; Habitat parcels 3 and 4 are dominated by scrub and low-value tall ruderal vegetation which is encroaching into any remaining areas of open vegetation, leaving minimal areas of bare ground. The latter are important for the invertebrate interest of the LWS and support most of the lichen, bryophyte and vascular plant diversity within the site. Excavation is taking place in the northern section of Habitat parcel 3.
Ellenberg values:	Habitat parcel 1: min 3, max 8, mean 5.81; Habitat parcel 2: min 3, max 8, mean 5.66; Habitat parcel 3: min 3, max 9, mean 6.28 Habitat parcel 4: min 5, max 6, mean 5.67
Ellenberg value score 4 and below:	Habitat parcel 1: EV4 grey alder, silver birch, broom, viper's bugloss and pedunculate oak; EV3: European gorse; Habitat parcel 2: common bent, silver birch, pedunculate oak and rowan; EV: creeping soft-grass, European gorse; Habitat parcel 3: EV4: common cudweed, soft rush, ribwort plantain, fleabane and ragwort; EV3: hawkweed oxtongue; Habitat parcel 4: none

Habitat type (UKHab category):	Habitat parcel 1: w1g - Other woodland; broadleaved; Habitat parcel 2: w1g - Other woodland; broadleaved; Habitat parcel 3: g3c - Other neutral grassland; Habitat parcel 4: h3 - Dense scrub
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland): poor (score 25); Habitat parcel 2 (woodland): moderate (score 28); Habitat parcel 3 (grassland) poor; Habitat parcel 4: (scrub), poor;
Limitation(s):	Habitat parcels 1 to 3, no limitations; Habitat parcel 4: Access along the transect route was not possible or safe without a health and safety induction from the adjacent quarry with excavators working metres away from the boundary. Also due to dense bramble the only possible means of access is via the quarry. Nevertheless, a short species list was made from a safe distance at this location near the start of the transect.
Habitat sensitivity - Area affected by Ndep:	Survey of the four Habitat parcels recorded species with every EV between 2 and 9 inclusive. Overall, fifteen nitrogen sensitive species of EV4 or less were recorded, including twelve species with EV4 and three with EV3. Habitat parcels 1 to 3 each had 6 nitrogen sensitive species. Habitat parcel 4 was not accessible, so it was not possible to get a full species list but it is also likely to contain nitrogen sensitive species. Two AWI were recorded in Habitat parcel 2, both nitrophiles which may increase in response to increased N deposition: creeping soft-grass (occasional, EV5) and bluebell (rare, EV6). No nitrophobes were recorded in any of the Habitat parcels. Across the four Habitat parcels, the following nitrophiles were frequent to locally abundant: cleavers, EV8, an indicator of nutrient enrichment (Habitat parcels 1 and 2), bramble, EV6 (Habitat parcels 1, 2 and 4), common nettle, EV8, and indicator of nutrient enrichment (Habitat parcels 1, 2 and 3), wood avens, EV7 (Habitat parcel 2), Yorkshire fog, EV5, (Habitat parcel 2) and false oat-grass, EV7 (Habitat parcel 3). Of the 4 Habitat parcels of this site, Habitat parcel 2 had the lowest mean EV value of 5.66 and Habitat parcel 3 had the highest mean EV value of 6.28.

Assessment

Table 6.129 Linford Pit LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.16 DM: 37.39 DS: 39.01
Operation - Ndep increase (max for site) kg N/ha/yr	2.11
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	21.12
Operation - increase over 0.4 kg N/ha/yr	1.71
Operation - impact extent (ha)	7.96
Operation - impact extent (% of site)	55.75
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.67.1 The increase in N deposition (DS-DM) is 2.11kg N/ha/yr. The site is designated for its invertebrate fauna, which tend to be typical of open mosaic habitat on previously developed land (a Priority Habitat), but the site also supports scrub and

woodland. Therefore, a precautionary LCL of 10kg N/ha/yr for broadleaved deciduous woodland was used. The increase in N deposition is 21.1% of this LCL.
The extent of the NAA is estimated at 7.96ha, which is approximately 56% of the site. This site is subject to a small area of temporary vegetation removal as part of the Project, but this is not within the NAA and makes no difference to the assessment of impacts as a result of changes in N deposition.
Most of the NAA is occupied by scrub and woodland, in which two AWI were recorded: bluebell and creeping soft-grass, both of which are nitrophiles and could increase in response to increased N deposition. There are also areas of bare ground and open grassland in which species with low EVs that are potentially sensitive to nitrogen were recorded: common cudweed, soft rush, ribwort plantain, fleabane, ragwort and hawkweed oxtongue. However, the presence of these species is more dependent on maintenance of an open sward by disturbance than it is on nutrient levels.
Given that the site is designated for its invertebrate fauna but most of the NAA has undergone succession to scrub and woodland, an increase in N deposition is not considered likely to affect the key characteristics or integrity of the site. Increased N deposition could potentially accelerate succession to scrub and woodland but management would be necessary to maintain the open areas irrespective of the magnitude of N deposition.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the rationale above and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.68 Little Chef Pasture SINC

Baseline

Table 6.130 Little Chef Pasture SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	525_LWS, 624_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North

Site area (ha):	3.2
Site Description - desk study:	The description from GiGL's web site states the following: 'This is a lightly grazed field with some flower-rich acid grassland. The grassland character varies from west to east. The western end of the field is more acidic, dominated by common bent with crested dog's-tail, red fescue and smaller cat's-tail grasses. Wildflowers include sheep's sorrel, cat's-ear, tormentil and bird's-foot-trefoil. The eastern part is more neutral in character. Here the grasses are dominated by creeping bent, cock's-foot and false oat-grass, with scattered patches of great willowherb and nettle. Hawthorn scrub occurs around the perimeter, with blackthorn, oak and field maple trees emerging from the hedges. Site location NGR: TQ5551 8895, post code RM11 3UB.
Site Condition - As described in citation/by site manager:	Unknown. The site description is from 2006, and says the site is lightly grazed, but it is unknown whether it is currently grazed.
Dates surveyed (2021 and 2022):	12/07/2022
Field survey habitat parcel descriptions:	The habitat was species-poor rough grassland with frequent false oat-grass, cock's-foot and creeping bent with occasional timothy, red fescue, common couch and sweet vernal grass. Occasional forbs included common nettle, common ragwort, greater willowherb and sheep's sorrel. There was an area of dense blackthorn scrub at the eastern end and western end. Towards the centre is an area prone to winter flooding with frequent great willowherb and compact rush, but generally the area was very grass-dominated.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Appears to be unmanaged.
Notes on required or beneficial management (field survey observations):	Control of encroaching scrub is recommended, and early spring and a late summer grassland cut to maintain and enhance the grassland habitat. Bramble is frequent in the northern edge due to an absence of management and some control is recommended.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Lack of management.
Ellenberg values:	min 3, max 8, mean 5.75

Ellenberg value score 4 and below:	Sweet vernal-grass (3); marsh willowherb (3); compact rush (3); pedunculate oak (4); sheep's sorrel (3); ragwort (4)
Habitat type (UKHab category):	g3c5 - Arrhenatherum neutral grassland; h3a blackthorn scrub
Habitat condition - area affected by Ndep:	Grassland condition poor.
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Little Chef Pasture SINC recorded species with every EV between 3 and 7 inclusive. There were no AWI species, and no woodland is shown on this 1885 historic map and it is likely this field has been unwooded since at least that time. Frequently occurring nitrophiles (Pitcairn et al., 2006) included cock's-foot EV6 (may respond to increased nitrogen), false oat-grass EV7, creeping bent EV6 (may invade rapidly) and Yorkshire fog EV5 (has the potential to increase). Species indicative of nutrient enrichment were cleavers EV8, nettle EV8 (occasional) and garlic mustard EV8 (rare).

Assessment

Table 6.131 Little Chef Pasture SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 20.73 DM: 20.37 DS: 20.91

Operation - Ndep increase (max for site) kg N/ha/yr	0.55
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.48
Operation - increase over 0.4 kg N/ha/yr	0.15
Operation - impact extent (ha)	0.18
Operation - impact extent (% of site)	5.58
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.68.1 The increase in N deposition (DS-DM) is 0.55kg N/ha/yr and 5.5% of the LCL. The site investigation confirmed that the site supports neutral grassland and blackthorn scrub. However, a precautionary LCL (10kg N/ha/yr) has been used because the review of aerial imagery to inform the modelling indicated scrub or broadleaved deciduous woodland around the boundaries of the site. The NAA is a strip of maximum 30m wide, along the northern boundary of the site and covers 0.18ha, (5.6%) of the site. There are two NAA areas within the SINC. Access to the most easterly NAA was not granted in 2022, but the habitat is considered to be broadly similar to that identified within the NAA to the west, possibly with an even greater extent of blackthorn scrub.

No lichens were present on suitable trees and there was no vegetation gradient recorded, no AWI species were recorded.

The grassland is rank and species-poor and dominated by nitrophilic grasses which have the potential to further expand and dominate the habitat due to increased N deposition (Pitcairn et al., 2006). However, succession to blackthorn scrub is a more likely trend, given it is already encroaching into the grassland areas due to lack of management.

Several occasionally recorded nitrophobic plant species were identified including sweet vernal grass (EV3) and marsh willowherb (EV3). These nitrophobic species have the potential to be lost due to increased nitrogen loading but are

already at risk of loss due to the lack of active management on the site.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.
Considering the precautionary LCL level applied, the area affected, the existing influence of scrub invasion and that the DS N deposition of 20.91kg N/ha/yr is within the critical load range for neutral grassland of 20-30kg N/ha/yr, it is not considered that increased N deposition will affect the integrity of the site.
Therefore, the impact is assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the rationale above and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.69 Low Street Pit LWS

Baseline

Table 6.132 Low Street Pit LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	449_LWS, 450_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	3.52
Site Description - desk study:	The LWS citation states: This is another site that lies on the regionally important Thames terrace gravels. Despite being modified by gravel extraction (which has ultimately led to an interesting habitat diversification), remnants of old grassland remain and the site is of particular note for the locally abundant subterranean clover, and Essex Red Data List plant, along with Lady's bedstraw and wild clary (also on the Essex Red Data List).
Site Condition - As described in citation/by site manager:	No condition information available from citation. Aerial imagery shows that much of the grassland present in 1999 has been replaced by scrub.

Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown, although aerials show scrub encroachment in the previously grassland areas particularly since 2010. MAGIC 2022 does not show the site to be under any agri-environment scheme.
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.133 Low Street Pit LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 17.27 DM: 17.19 DS: 33.43
Operation - Ndep increase (max for site) kg N/ha/yr	16.49
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	164.9
Operation - increase over 0.4 kg N/ha/yr	16.09
Operation - impact extent (ha)	3.51
Operation - impact extent (% of site)	99.66
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.69.1 No assessment as site lost in construction.

6.70 Merrals Shaw (AW_Theme_ID 1486881) AW

Baseline

Table 6.134 Merrals Shaw (AW_Theme_ID 1486881) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	239_AW, 249_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	10.4
Site Description - desk study:	Merrals Shaw AW lies within Ranscombe Farm Reserve, which also includes Cobham Woods, Head Barn Wood, Longhoes Wood and Great Wood. It is managed by Plantlife in partnership with Medway Council. The Ranscombe Farm Summary Management Plan 2018-2023 (2019) does not specifically mention Merrals Shaw Wood, although it does state that coppicing will be continued within the areas of sweet chestnut coppice and mixed broadleaved coppice.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	06/10/2021 and 17-18/05/2022
Field survey habitat parcel descriptions:	Habitat parcel 1: Sweet chestnut coppice, growing from ancient stools, dominated the canopy layer, which included occasional ash and oak standards. The shrub layer was made up frequent hazel, with occasional elder with field maple, hawthorn and wild privet, rare. The ground layer included various AWIs in the south-east such as bluebell and wood medick. Rarely occurring plants in the field layer included wood spurge, three-nerved sandwort, yellow archangel and butcher's broom. A well-used path dissected the woodland with frequent cyclists and dog walkers making use of it. Habitat parcel 2: Sweet chestnut coppice dominated the canopy layer with occasional ash

	and oak standards. The shrub layer comprises mainly hazel and hornbeam, with occasional field maple, holly, and hawthorn. The ground layer was dominated by bluebell, bramble and enchanter's nightshade, and rough meadow grass was frequent. There were areas of open space with good regeneration as well as glades adjacent to the main woodland paths.
Lichens:	No lichens on suitable trees
Vegetation gradient:	Habitat parcel 1: No visible gradient. Indicators of enrichment were scarce throughout. Habitat parcel 2 On a steep bank dropping to the road the sweet chestnut coppice gave way to planted hawthorn, likely from when the road was built. No vegetation gradient was observed in the designated site.
Notes on active management (field survey observations):	Habitat parcel 1: There was no recent active management visible, apart from paths which had been reinforced with hard-core. There was some attempt at removing the sweet chestnut coppice and replacing with hazel. Habitat parcel 2: No management evident apart from some signage
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: The canopy would benefit from being opened up in some areas. Reinstate sweet chestnut coppice on rotation to allow light in, in plant some hazel or other native shrubs to increase diversity. Habitat parcel 2: Re-instate sweet chestnut coppice rotation. Bramble is abundant although there are signs it is acting as a nursery for ash regeneration. The gradual removal of the sweet chestnut could create opportunities for regeneration of native tree species.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Merrals Shaw wood is part of the much larger Ranscombe Farm Reserved managed by Plantlife. Their summary management plan (Plantlife, 2019) has sections on visitor numbers, visitor facilities, control of invasive species, cleanliness, litter and dog fouling. Our site survey noted no signs or recent coppicing, dense canopy with little light reaching ground, and abundant brambles.
Ellenberg values:	Habitat parcel 1: min: 4; max, 8; mean 5.81 Habitat parcel 2: min 4; max 8, mean 5.76
Ellenberg value score 4 and below:	Pedunculate Oak: 4; silver birch 4
Habitat type (UKHab category):	Both Habitat parcels w1f: lowland mixed deciduous woodland

Habitat condition - area affected by Ndep:	Habitat parcel 1: Moderate (score 29) Habitat parcel 2 Moderate (score 31)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.
Habitat sensitivity - Area affected by Ndep:	Survey of Habitat parcel 1 recorded a mixture of species of high and low EVs. AWI species with an EV of 4 indicating sensitivity to nitrogen include early-purple orchid, primrose, butcher's-broom and a species of violet. Dog's mercury (EV 7), bluebell (EV 6) and rough meadow-grass (EV 6) are the most frequent species in the field layer. These species are identified as nitrophiles in Pitcairn et al (2006) and are known to respond to increased N. No gradient was evident, with species indicative of nutrient enrichment (e.g., common nettle and cleavers) recorded at low frequency throughout. Although the mean EV of Habitat parcel 2 is slightly lower than that of Habitat parcel 1, the only species with an EV of 4 in this part of the site are pedunculate oak, silver birch and a species of violet. The field layer also includes the nitrophiles bluebell and herb Robert, both with an EV of 6. The species with the highest EV (8) is garlic mustard. Other species indicative of high nitrogen levels such as common nettle and cleavers were not recorded at this location.

Assessment

Table 6.135 Merrals Shaw (AW_Theme_ID 1486881) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.65 DM: 48.13 DS: 50.2
Operation - Ndep increase (max for site) kg N/ha/yr	2.06
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	20.63
Operation - increase over 0.4 kg N/ha/yr	1.66
Operation - impact extent (ha)	6.11
Operation - impact extent (% of site)	58.75
Operation - impact duration (years until emissions DS = DM at opening yr)	14
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3).

Assessment Rationale

6.70.1 The DS N deposition is more than double the upper critical load of 20kg N/ha/yr at 50.2kg N/ha/yr. The increase in N deposition (DS-DM) is 2.06 kg N/ha/yr, more than 20% of the LCL. The site investigation did not record any existing gradient in the vegetation. There are AWI species present in the NAA that could be at risk of loss due to an increase in N deposition, such as early-purple orchid, primrose and butcher's-broom. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as common nettle and cleavers are currently scarce but could increase in cover as a result of increased N deposition. Given the sensitivity of some of the species present at this site, there is a risk that these could be outcompeted by species more responsive to increased N deposition and the vegetation composition at the site could change.

It is predicted that approximately 59% of this site will be affected by increased N deposition. Given the presence of

sensitive species, there could be an effect on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 14 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as moderate adverse. The effect of a moderate impact level on a site of national value could be either moderate or large. Considering the percentage of the site affected and the time taken to reduce to DM levels, a precautionary approach has been taken and the effect is assessed as large adverse (significant).

6.71 MILSTEAD_BASSILNE WOOD (AW_Theme_ID 1498502) AW

Baseline

Table 6.136 MILSTEAD_BASSILNE WOOD (AW_Theme_ID 1498502) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	212_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	3.7
Site Description - desk study:	The site is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. No further information is available from the desk study.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	21/05/22
Field survey habitat parcel descriptions:	Old sweet chestnut coppice woodland with an abundance of ancient woodland indicators. Sweet chestnut is the most abundant canopy species with locally frequent beech and occasional wild cherry, pedunculate oak and hornbeam. Elder is the most frequent shrub species, with occasional holly, hazel and bramble. Bluebell, dog's mercury and wood anemone are abundant in the ground layer, with frequent yellow archangel.

Lichens:	Oaks occasional in woodland with no birch. Only very few lichens present and not enough to complete lichen air quality test. The small samples present are classic indicators of N deposition, present approximately 15m from the road.
Vegetation gradient:	No visible vegetation gradient
Notes on active management (field survey observations):	Within the main body of the woodland, approximately 80m from the road was an area of recent sweet chestnut coppice lacking a tree canopy, with a pheasant pen nearby, but few signs of pheasant rearing or shooting. At a separate location, approximately 180m from the road, a recent clear fell was noted with extensive re-growth from stumps, some tree planting and old coppice stumps in areas of closed canopy woodland. Some non-native trees present, but infrequent. Heavy shading in yew-beech dominated woodland at western end of the woodland.
Notes on required or beneficial management (field survey observations):	Ground flora was prolific in coppiced and clear-felled areas, indicating this management would benefit the woodland.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	None observed
Ellenberg values:	min: 2; max: 8; mean 5.48
Ellenberg value score 4 and below:	EV4: wood anemone, marsh thistle, broom, ragwort, ribwort plantain, primrose, selfheal, Douglas fir, common fleabane, pedunculate oak, butcher's broom, heath speedwell, and early dog violet. EV3: bracken and wood sage. EV2, Scots pine.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Not collected
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	This description applies to the section of AW lying within 200m of the road, as the NAA (which covers a much smaller area) had not been modelled by the date of survey: Survey of Milstead/Baseline Wood AW recorded species with every EV between 2 and 8 inclusive. AW indicator species of EV 4, indicating potential sensitivity to nitrogen included wood anemone, primrose and butcher's broom. The nitrophile bluebell, EV6, was abundant in the field layer. It is listed by Pitcairn et al (2006) as a species which may respond to increased nitrogen in moist soils. Also abundant was the nitrophile dog's-mercury, EV 7, which is

	known to respond to increased nitrogen. The nitrophobe wood anemone, EV 4 was also abundant in the field layer. The nitrophobe and AWI yellow archangel was frequent in the field layer. Common nettle and cleavers, EV8, species indicative of nitrogen enrichment, were occasional.

Assessment

Table 6.137 MILSTEAD_BASSILNE WOOD (AW_Theme_ID 1498502) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 43.36 DM: 40.59 DS: 40.99
Operation - Ndep increase (max for site) kg N/ha/yr	0.4
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	3.99
Operation - increase over 0.4 kg N/ha/yr	0.0
Operation - impact extent (ha)	0.04
Operation - impact extent (% of site)	1.05

Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.71.1 The DS N deposition is more than double the upper critical load for broadleaved deciduous woodland of 20kg N/ha/yr at 40.99kg N/ha/yr. The increase in N deposition is 0.40kg N/ha/yr, which is 4% of the LCL for broadleaved deciduous woodland.

Primrose, yellow archangel, wood anemone and butcher's broom are AWI species recorded during the detailed site investigation that are potentially nitrogen -sensitive and could be at risk of loss due to an increase in N deposition. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Common nettle and cleavers, species indicative of nutrient enrichment are currently occasional but could increase in cover as a result of increased N deposition. There is a risk that some of the nitrogen-sensitive species could be out-competed in the NAA by species more responsive to increased N deposition. However, the NAA is only 1% of the site area and the magnitude of increase in N only just meets the LA 105 threshold of 0.4kg N/ha/yr. Therefore, no impact on site integrity is anticipated.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible.

Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.72 Mintching_Kingsdown Wood AW

Baseline

Table 6.138 Mintching_Kingsdown Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	214_AW, 215_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	88.48
Site Description - desk study:	The NAA lies on the embankment on the south side of the M2 and is shown as AW (centred on TQ9115 5896, postcode ME9 0QT). The inventory of Ancient Woodland for England describes Mintching/Kingsdown Wood as 'ancient and semi-natural woodland'.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	17/10/22 and 24/07/22
Field survey habitat parcel descriptions:	The NAA lies within the M2 motorway verge and appears to be secondary woodland, rather than ancient woodland, which suggests that the ancient woodland was removed when the M2 was constructed. Woodland has since established naturally on the embankment, although the diversity of the shrub layer suggests some planting is likely. The secondary woodland had an open canopy of about 20-30 yr old sweet chestnut, birch sycamore and ash over hawthorn and a diverse range of less frequent shrubs, with a ground layer of frequent bramble and bracken. Two ancient woodland indicators were recorded in the field layer, black bryony and slender St. John's wort. The adjoining ancient woodland lies outside the NAA and is dominated by sweet chestnut coppice with a ground layer of scattered to abundant bramble.
Lichens:	No lichens

Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	No management of woodland in motorway verge observed.
Notes on required or beneficial management (field survey observations):	Within the ancient woodland adjacent to the motorway verge: re-establish traditional coppice rotation, reduce dominance of sweet chestnut coppice and allow other native trees to regenerate.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The NAA occupies the hard shoulder of the M2 and comprises secondary woodland which is not a management priority. Lack of management for nature conservation appears to be the main threat to the adjacent ancient woodland.
Ellenberg values:	min 3, max 8, mean 5.46
Ellenberg value score 4 and below:	EV4: silver birch, marsh thistle and sessile oak. with EV3: Slender St John's wort, bracken and wood sage.
Habitat type (UKHab category):	w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Moderate (score 26)
Limitation(s):	The woodland verge was surveyed from the adjacent ancient woodland due to the proximity to M2.
Habitat sensitivity - Area affected by Ndep:	Survey of the NAA area within the secondary woodland of the M2 verge recorded species with every EV between EV3 and 8 inclusive. One AWI with potential sensitivity to nitrogen was present, slender St John's wort, EV3. No nitrophobes were present. A total of four nitrophiles were recorded, the most frequent of which was bramble EV6, which is known to respond to increased nitrogen Pitcairn et al (2006). The other nitrophiles were all rarely occurring and included ground ivy EV7, which can spread rapidly with increased nitrogen, dog's mercury EV7, which is known to respond to increased nitrogen and common nettle EV8, which is also known to respond to increased nitrogen and is an indicator of nutrient enrichment.

Assessment

Table 6.139 Mintching_Kingsdown Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 46.49 DM: 43.19 DS: 43.7
Operation - Ndep increase (max for site) kg N/ha/yr	0.51
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.1
Operation - increase over 0.4 kg N/ha/yr	0.11
Operation - impact extent (ha)	0.74
Operation - impact extent (% of site)	0.84
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.72.1 The increase in N deposition (DS-DM) is 0.51 kg N/ha/y. The NAA is located alongside the M2 motorway verge, comprising secondary woodland habitat (UK Habs w1g – other woodland, broadleaved), rather than ancient woodland. This suggests that when the M2 was constructed, the ancient woodland within the embankment was removed. Ancient woodland extends beyond the NAA either side of the M2.
A precautionary broadleaved deciduous woodland habitat with a LCL for this habitat of 10kg N/ha/yr has been used and an increase in N deposition is 5.1% of this LCL. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation.
One AWI plant species was identified, slender St John's wort (EV3). No nitrophobic species were identified. Frequently recorded nitrophilic species, including bramble, may increase with additional loading deposition and this may result in the loss of slender St John's wort from within the NAA.
Considering the habitat within the NAA is secondary woodland on the M2 embankment and only forms 0.8% of the AW site, there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.73 Mucking Heath LWS

Baseline

Table 6.140 Mucking Heath LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	321_LWS, 65_LWS
Resource importance:	County
Overlapping site:	No

Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	50.48
Site Description - desk study:	Mucking Heath LWS site lies within Orsett Golf Club (location NGR: TQ 656 805, post code RM16 3DT). The LWS description is as follows: ' The rough areas of this course, constructed on relict acidic grassland/heath, are of both floristic and invertebrate interest. Of particular note amongst the flora are Green-winged Orchid (*Orchis morio*) and Autumn Squill (*Scilla autumnalis*), both Essex Red Data List species, amongst Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra*), Lady's Bedstraw (*Galium verum*), Heath Bedstraw (*Galium saxatile*), Hoary Cinquefoil (*Potentilla argentea*), Field Scabious (*Knautia arvensis*), Knotted Clover (*Trifolium striatum*) and Field Wood-rush (*Luzula campestris*). The insect fauna includes 4 nationally rare, 50 Nationally Scarce and over 100 Local species.
Site Condition - As described in citation/by site manager:	The LWS description states the following: 'Condition and Proposed Management: The species of interest are likely to be restricted to the 'rough' areas of the golf course and course management is clearly vital in maintaining this level of interest. Maintenance of low soil nutrient levels if of paramount importance.
Dates surveyed (2021 and 2022):	09/08/22
Field survey habitat parcel descriptions:	Habitat parcel 1 (grassland): The shorter areas (frequently mown or grazed by rabbits) are generally dominated with common bent with frequent sweet vernal grass and yarrow and occasional sheep's sorrel. The less frequently mown/grazed areas tend towards MG1 with frequent cock's foot and false oat grass and with calcicolous species more frequent, including abundant lady's bedstraw and yarrow and occasional field scabious and greater knapweed. Habitat parcel 2: Mixed scrub dominated by bramble, hawthorn and English elm. In more open areas the ground layer is grassy and dominated by false oat-grass. The long drought has left much of the ground layer unidentifiable. Scattered trees of ash and oak occur to the south and in places these form a closed canopy. The ground layer here has locally abundant nettle and cleavers in the areas with scattered trees and ivy in areas with a closed canopy.
Lichens:	No lichens on suitable trees

Vegetation gradient:	No vegetation gradient observed.
Notes on active management (field survey observations):	Habitat parcel 1: (grassland) This area is managed as the golf course 'rough' grassland, with minimal cutting to prevent succession. It is a relatively extensive area of species poor rank grassland with frequent lady's bedstraw and yarrow and locally frequent field scabious, together with encroaching scattered saplings and scrub. Habitat parcel 2: No active management.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: The grassland diversity would be enhanced by an early spring and late summer cut, with arising removed from the grassland. Allow some grassland to develop into scrub/woodland and manage for wildlife. Habitat parcel 2: create some open areas for less competitive species;
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The site has considerable wildlife potential but appears to lack a strategy to improve its nature conservation condition. This could be achieved by having an ecological management plan agreed by the relevant parties. An example of where this would be useful is at the northern open areas and parts of the southern are also used to dump grass cuttings which has reduced the area of acid grassland, led to local eutrophication and enabled colonisation by competitive ruderal species.
Ellenberg values:	Habitat parcel 1: min 2, max 8, mean 4.63; Habitat parcel 2: min 3, max 8, mean 5.9
Ellenberg value score 4 and below:	Habitat parcel 1: 9 species with EV4: yarrow, common bent, spiked sedge, smooth hawk's beard, field scabious, musk mallow, ribwort plantain, pedunculate oat, ragwort; 6 species of EV3: sweet vernal grass, greater knapweed, downy oat grass, cat's ear, sheep's sorrel; EV2: lady's bedstraw, field wood rush, mouse ear hawkweed. Habitat parcel 2: EV4: broom and pedunculate oak; EV3: hawkweed oxtongue, wood sage and European gorse.
Habitat type (UKHab category):	Habitat parcel 1: g1 - Acid grassland; Habitat parcel 2: h3h - Mixed scrub
Habitat condition - area affected by Ndep:	Habitat parcel 1 (grassland): moderate; Habitat parcel 2 (scrub): good
Limitation(s):	The survey was carried out in the drought, when much of the field layer was dead and dry.
Habitat sensitivity - Area affected by Ndep:	Survey of the two Habitat parcels recorded species with every EV between 2 and 8 inclusive. Overall, twenty-one nitrogen sensitive species of EV4 or less were recorded, including nine species with EV4, nine species with EV3 and three with EV2 (lady's bedstraw, field wood rush and mouse-eared hawkweed.) Two AWI were recorded in the field layer,

	crab apple sapling and black bryony, but neither of these are considered sensitive to nitrogen. One nitrophobe, sweet vernal grass, EV3, was frequent in Habitat parcel 1. The following nitrophiles, which may increase in response to increased N deposition, were frequent to abundant in the field layer: ivy, EV6 (in Habitat parcel 2), bramble, EV6 (in Habitat parcel 2), nettle EV8 (in Habitat parcel 2), false oat-grass, EV7 (in Habitat parcel 1), cock's foot (in Habitat parcel 1) and cleavers, EV8 (in Habitat parcel 2). Other nitrophiles occurring with a frequency of occasional or rare were Yorkshire fog EV5, wood avens (EV7) and ground ivy (EV7). Habitat parcel 1 had the lowest mean EV value of 4.63 and Habitat parcel 2 had a mean EV value of 5.9. Habitat parcel 1 also had the highest number of potentially nitrogen sensitive species (17), while Habitat parcel 2 had only five species of EV4 and EV3.

Assessment

Table 6.141 Mucking Heath LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 24.09 DM: 23.31 DS: 24.64
Operation - Ndep increase (max for site) kg N/ha/yr	3.46

Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	34.57
Operation - increase over 0.4 kg N/ha/yr	3.06
Operation - impact extent (ha)	15.91
Operation - impact extent (% of site)	31.52
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.73.1 The increase in N deposition (DS-DM) is 3.46kg N/ha/yr. The LWS is part of Orsett Golf Club and is designated for the rough areas of the course, which are on relict acidic grassland/heath. Review of aerial imagery at the time of allocation of habitats and LCLs for modelling suggested that woodland habitat may also be present, so a precautionary LCL of 10kg N/ha/yr for broadleaved deciduous woodland was used. The CL range for acid grassland is 10-15kg N/ha/yr (APIS website) so the LCL is considered appropriate. The increase in N deposition is 34.6% of this LCL.
Site survey of the NAA recorded scrub, woodland and grassland habitat, with the scrub and woodland extending around the outer boundaries of the site (i.e. those subject to the highest increase in N deposition) and occupying more than half of the NAA. The scrub is dominated by bramble, hawthorn and English elm, with false oat grass dominant in more open areas The small patches of ash and oak woodland have a ground layer dominated by nettle and cleavers, which are indicative of nutrient enrichment. Therefore, the scrub and woodland of the NAA are not considered sensitive to increased N deposition. The grassland component of the NAA is rank and species-poor but supports species which are potentially sensitive to increased N deposition, such as sweet vernal grass, greater knapweed, downy oat-grass, cat's ear and sheep's sorrel (all EV 3) and lady's bedstraw, field wood rush and mouse ear hawkweed (EV 2).
The extent of the NAA is estimated at 15.91ha, which is approximately 31.5% of the site. There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but makes no difference to the outcome of the assessment of effects of increased N deposition. An increase in N deposition could cause an increase in grasses, a

decline in the more sensitive forbs and a decline in species richness, but the management of the site as a golf course has far more influence on the vegetation composition than the potential impact of increased NN deposition. The citation for the LWS acknowledges this, stating that course management is vital in maintaining the interest of the rough areas and that 'maintenance of low soil nutrient levels if of paramount importance'. Therefore, the predicted increase in N deposition as a result of the Project is not anticipated to affect site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the rationale above and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.74 Nurstead and Cozenden Woods, Nash Street LWS

Baseline

Table 6.142 Nurstead and Cozenden Woods, Nash Street LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	578_AW, 563_LWS
Resource importance:	County
Overlapping site:	AW_Theme_ID_1498304 AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	22.74
Site Description - desk study:	The site lies to the east of the A227. No further information is known.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	21/07/2022
Field survey habitat parcel descriptions:	Habitat parcel 1. W8d (ash-field maple—dog's mercury) woodland, ivy sub-community. The canopy is very open adjacent to road with frequent oak but ash is scarce. The understorey is dense and typical of W8 with frequent field maple and wayfaring tree. The ground layer is

	dominated by ivy and dog's mercury. A total of five AWIs were recorded: black bryony, wood melick, field maple, spindle and wayfaring tree. Away from the road, the canopy is closed and ash is much more abundant.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Tree felling noted adjacent to road, possibly to prevent trees falling into road.
Notes on required or beneficial management (field survey observations):	Where possible allow trees with ash dieback to remain standing to provide dead wood habitat. Selectively clear some the dominant ivy from the field layer, to allow less competitive woodland ground flora to establish.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Ash dieback.
Ellenberg values:	min 4, max 9, mean 5.79
Ellenberg value score 4 and below:	Pedunculate oak, 4
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Five AWI were recorded, all with EV5 or above, suggesting they do not have sensitivity to nitrogen. No nitrophobes were recorded. Three nitrophiles, which are likely to respond to increased nitrogen were recorded: dominant ivy (EV6), abundant dog's mercury (EV7) and occasional bramble (EV6). No vegetation gradient was observed. No species of EV8 were recorded (i.e., no common nettle or cleavers), although greater burdock, EV9, a species indicative of nutrient enrichment, was present (but rare) in the transect.

Assessment

Table 6.143 Nurstead and Cozenden Woods, Nash Street LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 39.64 DM: 36.95 DS: 37.45
Operation - Ndep increase (max for site) kg N/ha/yr	0.50
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.0
Operation - increase over 0.4 kg N/ha/yr	0.10
Operation - impact extent (ha)	0.11
Operation - impact extent (% of site)	0.5
Operation - impact duration (years until emissions DS = DM at opening yr)	5
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.74.1 The increase in N deposition (DS-DM) is 0.50kg N/ha/yr which is 5% of the LCL for broadleaved deciduous woodland. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. Ash dieback and Invasive Non Native Species (INNS) Japanese knotweed was noted to be present on the site. No AWI indicator species with EV values of 3 or 4 or nitrophobic species were recorded. Nitrophilic species were recorded including abundant dog's mercury (EV7) and occasional bramble (EV6), both of which are known to respond to increased nitrogen Pitcairn et al (2006). The absence of sensitive species and presence of nitrophiles suggests there is unlikely to be a significant change in vegetation composition due to an increase in nitrogen deposition. Considering the species composition and area affected (0.5%) there is unlikely to be an effect on site integrity. The time taken for DS NOx emissions to reduce to DM levels is estimated at 5 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as neutral, which results in a neutral effect (not significant).

6.75 Ockendon Railsides SINC

Baseline

Table 6.144 Ockendon Railsides SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	521_LWS, 521b_LWS, 775_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	14.63

Site Description - desk study:	NGR TQ5838 8439, post code RM14 2XH. Ockenden Railsides, code HvBII42E, is a SINC of Borough Grade 2 importance, lying in the London Borough of Havering. The site supports ancient woodland, scrub, secondary woodland, semi-improved neutral grassland and tall herbs. The citation is as follows: Havering's rail sides form a network of valuable undisturbed habitats, acting as corridors to facilitate the movement of wildlife around the borough. The total area of rail side land makes them a significant habitat in their own right. There are good areas of habitat along all the borough's railways, with cuttings and embankments generally supporting the widest and best habitats. Most of the rail sides are wooded, with ash (*Fraxinus excelsior*), oak (*Quercus robur*), and sycamore (*Acer pseudoplatanus*) dominating different sections. Scrub of elm (*Ulmus spp.*) and hawthorn (*Crataegus monogyna*) is also widespread. The most diverse woody vegetation is either side of the M25 on the Upminster-Ockenden line, where wild cherry (*Prunus avium*), wild plum (*P. domestica*), aspen (*Populus tremula*), spindle (*Euonymus europaeus*), crab apple (*Malus sylvestris*) and wild service-tree (*Sorbus torminalis*) all occur, suggesting an ancient woodland influence. Rough grassland and tall herbs are also widespread, mainly dominated by false oat-grass (*Arrhenatherum elatius*), nettle (*Urtica dioica*), rosebay willowherb (*Chamerion angustifolium*), cow parsley (*Anthriscus sylvestris*) and Chinese mugwort (*Artemisia verlotiorum*), often intermingled with bramble (*Rubus fruticosus agg.*). This rough land habitat can be found in places along the line from Upminster to Ockenden, east of Upminster, and on the north-west corner of Upminster Depot. Finer grassland of bents and fescues, with wild flowers such as wild carrot (*Daucus carota*), hoary ragwort (*Senecio erucifolius*), field scabious (*Knautia arvensis*) and common knapweed (*Centaurea nigra*), can be found in a few places, such as between Upminster and Ockenden.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.145 Ockendon Railsides SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 74.57 DM: 71.38 DS: 72.77
Construction – impact extent (ha)	0.45

Construction - years where impact exceeds 0.4 kg N/ha/yr	2025, 2026, 2027, 2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.43 DM: 52.66 DS: 54.1
Operation - Ndep increase (max for site) kg N/ha/yr	2.4
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	24.0
Operation - increase over 0.4 kg N/ha/yr	2.0
Operation - impact extent (ha)	4.44
Operation - impact extent (% of site)	30.35
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.75.1 No survey was undertaken in 2022 as access was not possible for safety reasons. The SINC is a mostly linear site, along the railway between Upminster in the north and Ockenden in the south. The NAA is at the southern end of the designation, extending either side of where the railway embankments pass beneath the M25. The LWS citation describes this as the most diverse part of the LWS, where the species recorded suggest an ancient woodland influence.
There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but this makes no difference to the outcome of the assessment of effects of increased N deposition.
During construction, the site is predicted to be affected for four years (2025-2028), when the maximum increase in N

deposition (DS-DM) is expected to be 2.85kg N/ha/yr (28.5% of the LCL for broadleaved deciduous woodland of 10kgN/ha/yr). The extent of the NAA is estimated to be 0.45ha (3% of the site).
During operation, the increase in N deposition (DS-DM) is 2.40kg N/ha/yr, which is 24% of the LCL of 10 kg N/ha/yr for broadleaved deciduous woodland.
The NAA is estimated at 4.44 ha (30.4% of the SINC), but some of this area encompasses the motorway and the railway itself, so the NAA and the vegetated habitat is smaller than this. However, due to the NAA representing the most diverse part of the SINC, it is possible there could be an effect on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. The four years of increased N deposition above the 0.4kg N/ha/yr during construction is within a smaller area so makes no difference to the assessment of impacts with respect to integrity or duration of effect.
Therefore, the impact level has been assessed as major adverse. The effect of a major adverse impact level on a site of county value could be either slight or moderate. Given the large magnitudes of the predicted DS N deposition and of the increase (DS-DM), the absence of survey information and the potential interest of this part of the SINC, this is considered to result in a moderate adverse effect (significant).

6.76 Parker's Shaw LWS

Baseline

Table 6.146 Parker's Shaw LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	4_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	1.64
Site Description - desk study:	Much of the central part of Parker's Shaw has been replanted with sweet chestnut (*Castanea sativa*) standards. Whilst Bramble (*Rubus fruticosus agg*) forms some dense ground cover, Bluebell (*Hyacinthoides non-scripta*) and Yellow Archangel (*Lamiastrum*

	galeobdolon) are also found in the ground flora. Towards the east side of the Site the character of the wood changes. Young Hornbeam (*Carpinus betulus*) coppice, Hawthorn (*Crataegus monogyna*) and Pedunculate Oak (*Quercus robur*) standards form a lower canopy with much scrub. The ground flora here comprises Bramble and Ivy (*Hedera helix*). The western and southern margins of the woodland have a contrasting structure to the other areas of the site. These areas have Hornbeam coppice with ground flora species including Yellow Archangel, Dog's Mercury (*Mercurialis perennis*) and the scrambling herb Black Bryony (*Bryonia dioica*). The status of this wood is uncertain, with possibly some part being derived from ancient woodland or hedgerows. Most woods named "shaw" are ancient landscape features in Essex. The eastern section of young woodland and scrub is clearly very recent but provides additional contiguous habitat for wildlife.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A

Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.147 Parker's Shaw LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 33.82 DM: 33.24 DS: 33.68
Operation - Ndep increase (max for site) kg N/ha/yr	0.44
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.38
Operation - increase over 0.4 kg N/ha/yr	0.04
Operation - impact extent (ha)	0.08
Operation - impact extent (% of site)	4.92

Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.76.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.44kg N/ha/yr, which is 4.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr.
The citation mentions that bramble is abundant in places. Typical woodland species such as bluebell and dog-mercury are present, but these are nitrophiles (Pitcairn et al 2006) and could increase in cover in response to increased N deposition. There are no species sensitive to N deposition listed on the citation.
Considering the probable absence of sensitive species and that the area affected is only 4.9% of the AW, no impact on site integrity is anticipated as a result of an increase in N deposition. However, the time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Despite the lack of survey data, the citation indicates that the site is unlikely to support species sensitive to nitrogen. Due to the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.77 Peartree Wood AW

Baseline

Table 6.148 Peartree Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	262_AW, 367_LWS_AW
Resource importance:	National

Overlapping site:	Court Wood, Shorne LWS
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	24.03
Site Description - desk study:	Peartree Wood (NGR: TQ70487130) overlaps with Court Wood, Shorne LWS, but the boundary of the former is closer (directly adjacent) to the ARN. The part of Peartree Wood within the NAA is ancient replanted wood (ARW). The citation for Court Wood, Shorne LWS describes the site as semi-natural broadleaved woodland on a range of soil types, which has largely been converted to sweet chestnut but still retains a good diversity of woodland ground flora, including 38 ancient woodland indicator species. The woodland complex is situated mainly on high ground but is dissected by a north/south valley and is generally undulating. On the higher, acid to neutral soils, the woodland consists of actively-managed sweet chestnut coppice with occasional sessile oak standards. Fine relict hornbeam coppice is present along some of the edges and sporadically within the chestnut. In Starmore Wood the coppice is more mixed. ash, hazel and field maple coppice stools occur occasionally and are dominant in the valley and on the lower ground on the chalk in the north. The ground flora is reasonably diverse, although bluebell, wood anemone and bramble dominate. Great wood-rush and bitter vetch have been recorded on the more acid soils. Common woodland plants such as early-purple orchid, sanicle, primrose, nettle-leaved bellflower and moschatel are found with dog's mercury on the base-rich soils at the northern end. A small stream bordered by pendulous sedge and supporting common aquatic species runs through a narrow block of ancient woodland and chalk and elm scrub in the north. The bryophyte flora is diverse and reflects the different soil types. Over 40 species have been recorded. Parts of Peartree Wood outside the NAA (Starmore Wood and Cole Wood) are ancient woodland and the LWS citation states that these have more mixed coppiced species than sweet chestnut.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	18/11/21 and 23/06/22
Field survey habitat parcel descriptions:	Habitat parcel 1: The woodland has an area of hazel coppice with AWIs beneath. The remainder of the woodland is sweet chestnut coppice circa 15 years old, growing from

	mature stools. The plot includes three mature oaks and a semi-mature ash. The woodland is open and bramble does not dominate the field layer allowing AWIs to grow. There is significant leaf litter. Habitat parcel 2: Woodland canopy of abundant young sweet chestnut coppice approximately thirty years old, with rare pedunculate oak. The understorey comprised occasional hazel and dogwood, with infrequent native woodland shrubs, including spindle, crab apple, hawthorn, hornbeam and holly. The field layer had abundant bramble where few AWI could grow. The woodland had a network of narrow dirt tracks kept open by small vehicles used to transport wood. The tracks are open bramble free glades allowing thirteen AWIs to flourish, including frequent bluebell, wood sedge, wood anemone and wood melick.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1: No active management. Habitat parcel 2: Some coppicing of sweet chestnut for timber extraction, wood storage. Wayleave, 50x10m mown for overhead cables. Bird boxes present.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: re-instate coppicing of sweet chestnut and hazel and install bird boxes. Remove rubble and rubbish. Habitat parcel 2: more coppicing required, and bramble control. Replace sweet chestnut with native species such as hornbeam.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcels 1 and 2: lack of management. The young, even age, sweet chestnut coppice and lack of understorey shrubs provide limited sheltered nesting locations for birds or refuges for small mammals. Up to 20% of Habitat parcel 1 is impacted by storage of building and other materials.
Ellenberg values:	Habitat parcel 1: min 4, max, 7, mean 5.68. Habitat parcel 2: min 3, max 8, mean 5.4
Ellenberg value score 4 and below:	Habitat parcel 1: wood anemone 4; pedunculate oak 4. Habitat parcel 2: the following species had EV4: wood anemone, marsh thistle, wild strawberry, soft rush, primrose, self-heal, pedunculate oak. The following species had EV3: creeping soft-grass and Slender St John's wort.
Habitat type (UKHab category):	w1f7 - other lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 1: moderate (score 28); Habitat parcel 2: moderate (score 27)

Limitation(s):	The 2022 survey was carried out over a larger NAA than required, because the pre-June 2022 NAA extended approximately 200m from the road whereas the June 2022 NAA extended only approximately 45m from the road.
Habitat sensitivity - Area affected by Ndep:	The site was divided into two Habitat parcels, Habitat parcel 1 and Habitat parcel 2, with transects and quadrats surveyed in each. Survey of the two Habitat parcels recorded species with every EV between 2 and 8 inclusive. Overall, nine nitrogen sensitive species of EV4 or less were recorded, including seven species with EV4 and two species with EV3. Two nitrophobe species of AWI (EV4) were recorded: wood anemone (transects 1 and 2) and primrose (transect 2). Two AWI of EV 3 were recorded, creeping soft grass (which is a nitrophile) and slender St John's wort (both in transect 2). Wild strawberry, EV4, was recorded in transect 2, but is not an AWI in Kent. Bramble, EV 6, was frequent in Habitat parcel 1 and abundant in Habitat parcel 2. Bramble is a nitrophile and known to respond to increased nitrogen (Pitcairn et al (2006)). The following nitrophiles were frequent in both transects: bluebell EV6 (may respond to increased nitrogen) and ivy EV6. Dog's mercury, a nitrophile of EV7, was recorded at low cover in the quadrat in Habitat parcel 1 (not recorded on the transect) and was occasional in Habitat parcel 2. No indicators of nutrient enrichment were present in Habitat parcel 1, and the species with the highest EV (8) in Habitat parcel 2 was garlic mustard. Rough meadow-grass, a nitrophile of EV6, was recorded at low cover in the quadrat of Habitat parcel 1, but nowhere else. This species is known to respond to increased nitrogen Pitcairn et al (2006). Of the two transects at this site, transect 2 had the lowest mean EV value of 5.4 and transect 1 had the highest mean EV value of 5.68. Transect 2 also had the highest number of nitrogen sensitive species (9) species and Transect 1 had the lowest at 2 sensitive species.

Assessment

Table 6.149 Peartree Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 38.8 DM: 37.32 DS: 38.39
Construction – impact extent (ha)	1.15
Construction - years where impact exceeds 0.4 kg N/ha/yr	2027, 2028
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 38.94 DM: 36.85 DS: 37.47
Operation - Ndep increase (max for site) kg N/ha/yr	0.62
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.23
Operation - increase over 0.4 kg N/ha/yr	0.22
Operation - impact extent (ha)	2.13
Operation - impact extent (% of site)	8.88
Operation - impact duration (years until emissions DS = DM at opening yr)	7
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.77.1 Peartree Wood AW overlaps with Court Wood, Shorne LWS. The boundary of the AW block extends to the edge of the A226, but the LWS boundary is 5-15m from the edge.
The increase in N deposition (DS-DM) is 0.62kg N/ha/yr and 6.2% of the LCL for broadleaved deciduous woodland of 10kg N /ha/yr.
The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation but noted leaf litter in the north of the site along with storage of building and other materials which is likely to be impacting upon the success of AWI growth in this area.
There are four nitrogen sensitive AWI ground flora species located within and adjacent to the NAA; wood anemone (EV 4, a nitrophobe) and primrose (EV 4, a nitrophobe), creeping soft grass (EV3) and slender St John's wort (EV3). The latter two were identified in the south along transect 2 only. These nitrogen sensitive AWIs are persisting in current high levels of N deposition, further increases may lead to a loss of these species. There is other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble, the latter already recorded as frequent and abundant in transects 1 and 2 respectively.
It is predicted that approximately 8.9% of this site will be affected by increased N deposition. Given the presence of sensitive species in this area, there could be an effect on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 7 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse. The effect of a moderate impact level on a site of national value could be either moderate or large. Given the precautionary measures adopted throughout the assessment, the effect is assessed as moderate adverse (significant).

6.78 Pot Kiln Wood and Sickle Wood SINC

Baseline

Table 6.150 Pot Kiln Wood and Sickle Wood SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	516_LWS
Resource importance:	County
Overlapping site:	No

Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	9.45
Site Description - desk study:	The site lies within the London Borough of Havering (post code RM14 1LX; NGR: TQ 571 886). It comprises two small woods, one of them recently sown as part of the Thames Chase Community Forest. Habitats include scrub, secondary woodland, semi-improved neutral grassland and tall herbs. The site description states: 'Pot Kiln Wood is owned by the Woodland Trust and forms part of the Thames Chase Community Forest. It comprises a mosaic of scrub and grassland that has developed since ploughing during the First World War. The rather species-poor sward is dominated by creeping bent and Yorkshire fog with abundant buttercups, creeping cinquefoil and white clover. There is a spreading drain with poached margins that support common fleabane, great willowherb and fool's watercress. Scrub of blackthorn, hawthorn and dog rose, with bramble margins, is present as old hedges and random clumps, providing habitat for nesting birds. There are a few mature oaks and an area of tree planting in the north-east corner. Sickle Wood is an area of scrub with a partial woodland canopy. Where present, the canopy comprises oak, ash, field maple and includes a single crab apple. Hawthorn is almost continuous throughout and forms much of the lower scrubby canopy, which also includes cherry-plum and elder. The ground flora is dominated by ivy with a range of woodland flowers such as red campion, hedge woundwort, cow parsley, Italian lords-and-ladies and stinking iris, the latter two probably garden escapees. Some of the commoner woodland grasses are also present. The site as a whole provides suitable habitat for foraging and breeding birds and a variety of invertebrates.'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	13/07/22
Field survey habitat parcel descriptions:	Habitat parcel 1: Rank species poor neutral grassland with abundant false oat-grass and locally abundant Yorkshire fog. Some areas which have been subject to horse grazing are more diverse with frequent bird's foot trefoil and occasional wild carrot. Habitat parcel 2: Semi mature broadleaved plantation woodland with ash and oak co-dominant over frequent to locally abundant bramble. Occasionally dense understorey with hawthorn, field maple and guelder rose but understorey generally very sparse. The western part of the Habitat parcel was not assessed due to dense impenetrable scrub.

Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	Rank grassland which appears to have minimal management although some areas have been horse grazed
Notes on required or beneficial management (field survey observations):	Increased grazing and/or grass cutting at beginning of spring and the end of the flowering season. Scrub control.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Lack of management and scrub encroachment.
Ellenberg values:	Habitat parcel 1: min 2, max 8, mean 5.56. Habitat parcel 2: min 4, max 7, mean 6.21.
Ellenberg value score 4 and below:	Habitat parcel 1: EV4: soft rush, ribwort plantain, common fleabane, pedunculate oak, creeping buttercup, common ragwort and common vetch. Habitat parcel 2: EV4: pedunculate oak.
Habitat type (UKHab category):	Habitat parcel 1: g3c - Other neutral grassland. Habitat parcel 2: w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Habitat parcel 1 (grassland): moderate; Habitat parcel 2 (woodland) poor 24 points.
Limitation(s):	The west of Habitat parcel 2 was not assessed due to dense impenetrable scrub.
Habitat sensitivity - Area affected by Ndep:	Survey of the NAA within Pot Kiln Wood and Sickle Wood SINC recorded species with every EV between 2 and 8 inclusive. The survey recorded two habitats (grassland and woodland) which were surveyed separately. No AWIs were recorded in either. Within the grassland, the nitrophile Yorkshire fog EV5 was frequent to locally abundant. This species has the potential to increase with increased nitrogen (Pitcairn et al.,2006). The nitrophile false oat-grass EV7 was abundant and the nitrophile creeping bent EV6 was frequent. The latter species can invade rapidly under increased N deposition (Pitcairn et al., 2006). Nettle (EV8) was recorded as occasional and is an indicator of nitrogen enrichment. Within the woodland, no AWIs were recorded, and the only species recorded with EV4 was pedunculate oak. The nitrophile ivy EV7 was frequent, and bramble EV6 was frequent to locally abundant. Bramble is known to respond to increased nitrogen (Pitcairn et al., 2006). The grassland has a lower mean EV (5.56) than the woodland (EV 6.21) and had nine species with EV4 or below.

Assessment

Table 6.151 Pot Kiln Wood and Sickle Wood SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 0 DM: 0 DS: 0
Construction – impact extent (ha)	0
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 35.54 DM: 34.85 DS: 35.6
Operation - Ndep increase (max for site) kg N/ha/yr	0.74
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	7.42
Operation - increase over 0.4 kg N/ha/yr	0.34
Operation - impact extent (ha)	1.66
Operation - impact extent (% of site)	17.58
Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required

Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.78.1 The increase in N deposition (DS-DM) is 0.74kg N/ha/yr. The site supports predominantly broadleaved deciduous woodland with areas of neutral grassland. The lowest LCL of these habitats is 10kg N/ha/yr (broadleaved deciduous woodland) and the increase in N deposition is 7.4% of this LCL. The NAA covers 17.6% of the site.
No lichens were present on suitable trees and there was no vegetation gradient recorded. There were no AWI species present in either habitat.
Within the grassland habitat, there are frequent to abundant nitrophilic grasses, these grasses have the potential to become dominant in response to increased nitrogen. There are several nitrophobic plants present within the grassland, the most sensitive recorded was birds-foot trefoil (EV2). This and the other sensitive species are at risk of being lost due to an increase in N deposition and the potential increase in ground cover by the more competitive nitrophilic grasses.
Within the woodland, ivy (EV7) and bramble (EV6) were frequently recorded. Bramble is likely to increase (Pitcairn et al, 2006) and could become dominant under increased N deposition. However, due to the lack of AWI and sensitive plant species, there is unlikely to be an observable change in vegetation composition. Considering the site citation, which refers to a species-poor sward and non-native plant species and given the extent of the NAA, it is not considered that the increase in N deposition will affect the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact is assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.79 Putt Wood AW

Baseline

Table 6.152 Putt Wood AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	220_AW, 767_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	19.89
Site Description - desk study:	The site is designated AW and lies along the north side of the M2. NGR TQ982 605, post code ME13 0SE. The inventory of Ancient Woodland for England describes the site as 'ancient and semi-natural woodland'. The AW site is contained within Ospringe Valley LWS. The LWS citation describes Putt Wood as lying on a dry chalk valley, and as ancient woodland actively managed as coppice or coppice-with-standards, though part of the Putt Wood dominated by hornbeam in the centre of the site is not managed. The LWS citation describes the site as dominated sweet chestnut coppice, but with hornbeam, and on the lower slopes, ash, hazel and field maple coppice are present, with a rich and varied ground flora in parts of the site, including lesser and greater butterfly orchids, early purple orchid and fly orchid. The citation describes that dog's-mercury is dominant in more calcareous areas, together with bluebell and wood anemone, and that sanicle is locally abundant in the lower parts of Putt Wood, and wood speedwell, common dog-violet, moschatel, wood-sedge and pignut also occur. In the more acid parts of the LWS, there is occasional wood sorrel, hairy woodrush and southern woodrush, and orpine and heath cudweed are also present. In total, 32 ancient woodland indicator species have been recorded from the LWS.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	16/08/22

Field survey habitat parcel descriptions:	The NAA covers a very steep bank next to a bridge which is has abundant field maple and occasional ash in the canopy. The understorey has a variety of shrubs including frequent dogwood, hazel and hawthorn. Occasional in the understorey are wild privet, Norway maple, sycamore and rose. Spindle and butcher's broom were rare. The trees are not obviously planted and have an age range of approximately 40 years. Three AWI were recorded in the field layer, primrose, black bryony and butcher's broom. There is no sign of browsing by herbivores or other damage or disturbance. There is considerable litter thrown over from the road by drivers.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No visible vegetation gradient
Notes on active management (field survey observations):	No current management observed.
Notes on required or beneficial management (field survey observations):	Suggested management is to remove the rubbish and to repair the fence to prevent access.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Rubbish from passing cars
Ellenberg values:	min 4, max 8, mean 5.93
Ellenberg value score 4 and below:	Three species with EV4: wild strawberry, primrose and butcher's broom
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Putt Wood AW recorded species with every EV between 4 and 8 inclusive. AWI species with an EV of 4 indicating potential sensitivity to nitrogen include butchers' broom and primrose. Primrose is noted as a nitrophobe by Pitcairn et al (2006). The nitrophiles ivy, EV7, and bramble EV6 were frequent in the field layer; bramble is known to respond to increased nitrogen. The field layer also included the following nitrophiles with a DAFOR value of occasional or rare: herb robert, wood avens, ground ivy, dog's mercury and common nettle. The species with the highest EVs were hedge woundwort and common nettle (both EV8), indicating nutrient enrichment.

Assessment

Table 6.153 Putt Wood AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 50.43 DM: 46.6 DS: 47.11
Operation - Ndep increase (max for site) kg N/ha/yr	0.51
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.11
Operation - increase over 0.4 kg N/ha/yr	0.11
Operation - impact extent (ha)	0.02
Operation - impact extent (% of site)	0.1
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.79.1 The increase in N deposition (DS-DM) is 0.51kg N/ha/yr, which is 5.1% of the LCL of 10kg N/ha/yr for broadleaved deciduous woodland habitat. Site survey identified AWI species that are sensitive to N deposition, including primrose and butcher's broom. These species are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. Both sites also support other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, ivy and bramble. Species indicative of nutrient enrichment such as common nettle are present and could increase in cover as a result of increased N deposition. Given the sensitivity of some of the species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in the affected part of the site could change. However, the NAA is only 0.1% of the site and therefore it is unlikely that there will be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and reversible. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.80 Rainbow Shaw LWS

Baseline

Table 6.154 Rainbow Shaw LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	66_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	2.21

Site Description - desk study:	The site is designated as Rainbow Shaw LWS, whose description (undated) states that the site 'is thought to be a small ancient woodland fragment'. However, it is not shown as AW on MAGIC 2022, but as 'deciduous woodland'. The description also states that Rainbow Shaw LWS is 'an overgrown coppice of sweet chestnut with some hazel, field maple and a canopy of pedunculate oak and some ash. The springtime flora is dominated by a carpet of bluebells'.
Site Condition - As described in citation/by site manager:	From Th45 Citation Rainbow Shaw: 'The woodland has been badly damaged by previous gale events, but it should be realised that this is a natural phenomenon that does create new habitat opportunities within the wood, including dead wood ecosystems. Given its historical management as sweet chestnut coppice, this management could be resumed, although promotion to high forest may be more practical at this location'.
Dates surveyed (2021 and 2022):	05/06/2021 and 24/05/2022
Field survey habitat parcel descriptions:	Old sweet chestnut coppice woodland, but now more resembling high forest. Sweet chestnut was abundant in the canopy with frequent oak and ash. In the understorey elder was abundant, while field maple and hawthorn were frequent. Occasional understorey species included hazel and wild cherry. The field layer had dominant cleavers with abundant bluebells and nettles. Bramble was more prevalent at the northern part of the site.
Lichens:	Only one small oak was found with lichens. Insufficient for lichen survey. Species present on tree were *Physcia sp* and *Xanthoria sp*.
Vegetation gradient:	No visible vegetation gradient. Cleavers abundant throughout. Nettle more frequent at northern end due to possible run off from adjacent quarry. Hoford road is not open to traffic and heavily overgrown.
Notes on active management (field survey observations):	No current management. Heavy shading from canopy with ground layer dominated by bluebell and cleavers. This is typical throughout
Notes on required or beneficial management (field survey observations):	Canopy thinning to open up the field layer to light. There is an area of dense nettles at the top of the slope on the woodland edge, which is possibly due to run-off. Beneficial management could include buffering to prevent run-off.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The site investigation recorded evidence of game management within the site, which could disturb the site and add nutrients around feeding stations.

Ellenberg values:	Min 3, max 8, mean 6.32.
Ellenberg value score 4 and below:	Silver birch, 4, wood anemone 4 and bracken, 3.
Habitat type (UKHab category):	w1f
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	None recorded
Habitat sensitivity - Area affected by Ndep:	Habitat parcel 2 had the lowest mean EV of 5.4 and Habitat parcel 1 had mean EV of 5.68. Habitat parcel 2 had nine potentially nitrogen sensitive species, whereas Habitat parcel 1 had two.

Assessment

Table 6.155 Rainbow Shaw LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 29.7 DM: 29.62 DS: 37.99
Operation - Ndep increase (max for site) kg N/ha/yr	8.39

Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	83.89
Operation - increase over 0.4 kg N/ha/yr	7.99
Operation - impact extent (ha)	2.0
Operation - impact extent (% of site)	90.69
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.80.1 The increase in N deposition (DS-DM) is 8.39kg N/ha/yr, which is 83.9% of the LCL of 10kg N/ha/yr for broadleaved deciduous woodland habitat. Species typical of nutrient enrichment were present at this site, including common nettle EV8 (abundant) and cleavers EV8 (dominant). The only species that is noted as a nitrophobe in Pitcairn et al. (2006) is bracken (EV 3), which currently occurs frequently in the field layer. However, dense stands of bracken are not desirable in woodland as it out-competes other species. More than 90% of this 2.21ha site is predicted to be affected by an increase in N deposition of 8.39kg N/ha/yr for >15yr. However, approximately 50% of this site is due to be permanently removed as part of the Project, although the proportion of the remaining area affected by increased N deposition remains similar. Other factors such as run-off and management for game appear to be already affecting the vegetation composition of the site, with species that are indicative of high nutrient levels already dominant in the vegetation and nitrogen sensitive species absent (apart from bracken). Therefore, there is unlikely to be an observable change in vegetation composition despite a permanent high magnitude of increase across nearly the whole site. As a result, the impact level is assessed as no change, which results in neutral significance (not significant).

6.81 Rede Common LNR

Baseline

Table 6.156 Rede Common LNR: Baseline

Designation:	LNR
AQ (Operation) model point codes:	30_LNR
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	10.82
Site Description - desk study:	The site was designated as Rede Common LNR in 2018 and lies along the southern side of the A2. There is no information available on the Natural England website, but the Friends of Rede Common website describes it as 'former farmland used for grazing, arable and market gardening and now comprising an area of open grasslands surrounded by scrub and trees'. The Rede Common LNR Management Plan describes the site 'as grassland, scrub areas and woodland areas (the latter both mature woodland and developing woodland. Neither the habitats or species are rare but there is great wildlife value in the mosaic of habitats and the semi-natural aspect of the site within the surrounding urban area'. Aerial photography shows that Rede Common was, until the later part of the 20th century open farmland, crossed by hedges. When farming ended, these hedges expanded and scrub developed on the slopes of the site. The scrub and woodland is therefore fairly recent in origin. The plan states that at the northern extent of the site, adjacent to Watling Street, is a band of more mature trees on the bank between the path and the road. The dominant species of the scrub woodland is hawthorn. The scrub woodland is comprised of mainly even-aged hawthorn with a few other species including ash, oak, birch and beech. There is a very sparse understorey comprising mainly holly and elder. The hawthorn casts a dense

	shade which limits the ground flora, which is not very diverse and mainly consists of ivy with some bramble and nettle and occasional other flowering species.
Site Condition - As described in citation/by site manager:	The Rede Common Management Plan refers to the grassland area as follows: The grassland of Rede Common is neutral grassland, most of which is likely to have been improved at some point. The species are typical of those found on fairly nutrient-rich neutral soils. The growth of the grass is vigorous, producing a tall sward in which flower species are largely overwhelmed. Nonetheless, this grassland is invaluable for wildlife including insects and small mammals, and the extent of the habitat in an urban setting is of great significance. Previous management plans indicate that the northernmost area of grassland was once mowed short as amenity grassland. The management proposals of 1992 indicated some acid grassland species in the south west area (likely to be in the area of the gravel Head deposit), although this distinction was not evident in 2016). Although there is not a high degree of diversity in the sward, there is also a fairly low incidence of potentially problematic weed species. Control of weeds such as hogweed and thistle will increase the likelihood that the grass can be used for hay. The grassland is of such importance for nature conservation due to the current management regime of leaving the grass long, as this provides habitat and food sources for a range of species. Over time however, if not managed, the scrub and bramble will continue to encroach across this grassland, as it has done during the past decades, and the grassland will be lost. To prevent this the grassland needs to be cut regularly. It is also important to leave some areas uncut each year to provide a refuge for insects and mammals. It is proposed in the Management Plan that the grassland is cut annually and the grass removed as is carried out currently. Uncut margins should be left around the edges of the fields. These should be cut on rotation to prevent bramble and scrub encroaching.
Dates surveyed (2021 and 2022):	28/04/2022
Field survey habitat parcel descriptions:	Habitat parcel 1: WOODLAND. Along the northern boundary of the site is a narrow strip of broadleaved woodland running parallel to the road. It comprises mixed mainly native species with some sycamore. Some pedunculate oaks have a DBH of 60-80 cm. The hawthorns within this woodland are fairly tall and spindly with a holly understorey creating significant shade with a predominantly ivy field layer. Habitat parcel 2: SCRUB. The scrub is usually dense with frequent hawthorn and bramble, with clematis sometimes smothering trees. In tree-less areas and margins cover is dominated by bramble and nettle.

	Habitat parcel 3: GRASSLAND. The grassland is usually undulating on gentle gradients, dominated by coarse grasses with low cover of forbs. At the time of survey was 20-40 cm tall and not recently cut. The grassland had a low diversity of forbs in the sward. Some steeper banks had more diverse forbs.
Lichens:	Approximately 20m south of the A2 road three pedunculate oak trees within 20m of each other had semi-mature branches which supported lichens and gave a LIS score of 1.55 (a 'very polluted' location). No other suitable trees or branches supporting lichens were observed.
Vegetation gradient:	There is no evidence of a vegetation gradient. The grassland and scrub is of the same composition both close to and far from the road. The woodland is a narrow strip parallel to the road and so cannot be compared with woodland further away from the road (beyond the NAA).
Notes on active management (field survey observations):	A network of paths ran through the area with occasional benches and bins for dog waste. The area was predominantly litter free. The grassland appears to be regularly cut but allowed to grow long. There is some erosion through path widening but little visible dog fouling. The following active management was observed or researched: grass cutting, scrub control at margins, pathway upkeep, dog litter bins, litter picking and tree planting.
Notes on required or beneficial management (field survey observations):	Open up areas of dense hawthorn woodland. Clear glades in scrub areas. Remove non-natives and invasive shrubs and trees. Consider different cutting regimes, e.g., shorter cut on banks.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Pressures noted in the Rede Common Management Plan: public access; litter and fly tipping; dog fouling; scrub encroachment into grassland and overshading of woodland ground flora. The woodland strip (Habitat parcel 1) was noted in 2022 to be heavily used by dog walkers and has a bin for dog waste. It also had frequent ivy and human litter. The scrub (Habitat parcel 2) was usually dense with frequent hawthorn and brambles with clematis sometimes smothering trees. Scrub margins often dominated by common nettle. The grassland (Habitat parcel 3) is usually undulating on gentle gradients, dominated by coarse grasses with low percentage cover of forbs. At the time of survey was 20-40 cm tall and not recently cut.

Ellenberg values:	Habitat parcel 1 woodland: min 4, max 8, mean 6.2. Habitat parcel 2 scrub: min 4, max 8, mean 5.67. Habitat parcel 3: grassland min 3; max 9, mean 5.76.
Ellenberg value score 4 and below:	EV 4: pedunculate oak, whitebeam, rowan, soft-brome, common mouse ear, common ragwort, ribwort plantain, bulbous buttercup, yellow rattle, common sorrel and common vetch. EV 3: cat's-ear, sheep's sorrel, and common vetch.
Habitat type (UKHab category):	Habitat parcel 1: w1g Other woodland, broadleaved. Habitat parcel2: h3h mixed scrub. Habitat parcel 3 g3c, other neutral grassland.
Habitat condition - area affected by Ndep:	Habitat parcel 1: Woodland: Moderate (score 28) Habitat parcel 2 Scrub Moderate Habitat parcel3 Grassland: good
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	Survey of Rede Common LNR recorded a mixture of species of high and low EVs. Within the grassland, there were 8 species with EV of 4 and 3, as follow: common cat's ear, ragwort, ribwort plantain, bulbous buttercup, yellow rattle, wood sorrel, sheep's sorrel, and common vetch. Within the woodland and scrub there were no AWI species with an EV of 4 or less. The woodland contained the nitrophiles: nettle, EV 8, an indicator of nutrient enrichment, herb Robert, EV 6, bramble EV 6 (these three species are known to respond to increased nitrogen), wood avens and bluebell EV 6 (the latter species may respond to increased nitrogen in moist soils). Within the scrub the following nitrophiles were present: rosebay willowherb, bramble and nettle, an indicator of nutrient enrichment. The grassland had the highest EV species (broad-leaved dock, EV9), but also eight potentially nitrogen sensitive species. It also had the highest mean EV of the 3 habitats, suggesting high nutrient levels.

Assessment

Table 6.157 Rede Common LNR: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 28.08 DM: 25.22 DS: 26.33
Operation - Ndep increase (max for site) kg N/ha/yr	1.12
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	11.16
Operation - increase over 0.4 kg N/ha/yr	0.72
Operation - impact extent (ha)	3.49
Operation - impact extent (% of site)	32.27
Operation - impact duration (years until emissions DS = DM at opening yr)	10
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.81.1 The increase in N deposition (DS-DM) is 1.12kg N/ha/yr and 11.2% of the LCL for broadleaved deciduous woodland. The NAA comprises 32.3% of the site and is a mixture of woodland and grassland. The woodland area within the NAA does not contain any nitrogen sensitive species. The most abundant species in the grassland are rank grasses such as false oat-grass and cock's-foot that are not sensitive to N deposition. The Rede Common Management Plan states that the grassland is likely to have been improved at some point and supports species typical of those found on fairly nutrient-rich neutral soils. Although the survey recorded some forb species with low EVs that could be sensitive to nitrogen (e.g., cat's-ear, sheep's sorrel, and common vetch), these are very infrequent in the sward. It is of note that the CL range for neutral grassland is 20-30kg N /ha/yr and this is for low and medium altitude hay meadows, which are characteristically lower in nutrients than the type of grassland at this site. The DS of 26.33kg N/ha/yr is within the CL range for this more sensitive grassland habitat type, but the LCL is exceeded by 5.6%. It is possible that an increase in N deposition could enable the more competitive rank grassland species, as well as bramble and other scrub species, to expand at the expense of the more sensitive forb species. Therefore, these species are at risk of loss in this part of the site and there could be an effect on species richness of the grassland habitat and potentially on overall site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 10 years, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as moderate adverse, which results in a slight adverse effect (not significant).

6.82 REED'S SHAW (AW_Theme_ID 1498441) AW

Baseline

Table 6.158 REED'S SHAW (AW_Theme_ID 1498441) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	206_AW_LWS
Resource importance:	National

Overlapping site:	Yaugher Woods LWS
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	1.1
Site Description - desk study:	Reference has been made to the citation for Yaugher Woods LWS, which includes the separate woodlands of Yaugher Woods, Reed's Shaw, Stoners Rough Wood, and Matts Hill Shaw. The site comprises an area of ancient woodland which is no longer actively managed as sweet chestnut coppice but includes some mixed coppice and small nearby areas of unmanaged mixed coppice. The woodland is mostly situated on the plateau clays, but more calcareous areas occur in a shallow valley in Yaugher Woods. Standard beech, sessile and pedunculate oak are very occasional in some parts. Hornbeam, ash, hazel and, less commonly, field maple, are other coppice species. Bluebell *Hyacinthoides non-scripta* and wood anemone *Anemone nemorosa* are dominant in the ground flora. Bramble *Rubus fruticosus agg*. occurs but is never dominant. Twenty-five ancient woodland indicator species have been recorded from Yaugher Woods LWS and 18 on a recent brief visit. These include early purple orchid *Orchis mascula*, which is often abundant (particularly in Reeds Shaw), wood sorrel *Oxalis acetosella*, heath cudweed, *Gnaphalium sylvaticum*, yellow archangel *Galeobdolon luteum* and pignut *Conopodium majus* and butcher's-broom *Ruscus aculeatus*. The open rides and areas below the pylons are the most diverse. Close to the M2 motorway are more open and scrubby areas with good numbers of mature beech and oak.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A

Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.159 REED'S SHAW (AW_Theme_ID 1498441) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 42.55 DM: 39.46 DS: 39.93
Operation - Ndep increase (max for site) kg N/ha/yr	0.47
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.7
Operation - increase over 0.4 kg N/ha/yr	0.07
Operation - impact extent (ha)	0.1
Operation - impact extent (% of site)	9.15
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Moderate adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.82.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 0.47kg N/ha/yr. A review of aerial imagery indicates that the NAA supports mixed deciduous woodland. A precautionary LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been used and the increase in N deposition is 4.7% of this LCL. A survey was undertaken of the NAA within Yaugher Woods AW, which is located approximately 20m to the east of the NAA within this site and therefore using aerial imagery and considering the proximity of the NAA within Yaugher Woods AW it is reasonable to assume the species composition will be broadly similar.
Yaugher Woods AW NAA site survey information:
“No lichens or vegetation gradient was observed during the site investigation. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Three species were identified with an EV of 4 and two with an EV of 3, clustered bell flower and bracken. A total of 4 nitrophiles were present in the field layer, including frequent to

locally abundant dog's mercury. No nitrophobes were present"
Desk study site information highlights that early purple orchid (EV4) is present within areas of this AW and there are other nitrogen-sensitive AWIs recorded within the wider LWS.
Additional N deposition may lead to an increase in nitrophilic species, such as bramble, which could lead to the loss of nitrogen sensitive species if they are present within this NAA. The NAA is 9.2% of this small (1.1ha) site and therefore the loss of nitrogen-sensitive species could result in an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse. The significance of effect of a moderate impact level on a site of national value could be either moderate or large adverse. Given that this is a small block of woodland and due to the precautions already adopted throughout the assessment, the effect is assessed as moderate adverse (significant).

6.83 River Medway and Marshes, Wouldham LWS

Baseline

Table 6.160 River Medway and Marshes, Wouldham LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	441_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	196.91
Site Description - desk study:	The site was designated in 1987 for 'its matrix of habitats comprising the River Medway and grazing marsh along with saltmarsh and reed beds adjacent to the river itself, which form a county important site for wintering birds. MAGIC maps (2022) show part the NAA to include an area of mudflat and coastal saltmarsh, both of which are priority habitats. The LWS description states that species present within the saltmarsh include sea aster, sea arrow grass, sea milkwort, sea plantain and saltmarsh rush.

Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	18/08/22
Field survey habitat parcel descriptions:	Habitat parcel 1: A riparian stretch of tidal mud on the river Medway with salt marsh plants, running through a “marina” of water moored vessels. Primarily sea aster and halberd orache with sea couch, salt marsh grass, cord grass and sea club rush also present. The biggest impact is from human modification of upper banks of the Medway such as boats and other artefacts on the upper mid banks. There is evidence of a common reed stand which has completely disappeared this year.
Lichens:	No lichens
Vegetation gradient:	No visible vegetation gradient
Notes on active management (field survey observations):	Habitat parcel 1: there is considerable human influence here but no obvious habitat management.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: allow more riparian space to naturalise. Remove rubbish from the area.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: The biggest impact is from human modification of upper banks of the Medway such as boats and other artefacts on the upper to mid banks.
Ellenberg values:	Habitat parcel: min 5, max 8, mean 6.43.
Ellenberg value score 4 and below:	Habitat parcel 1: no species with EV less than 4
Habitat type (UKHab category):	t2a - Coastal saltmarsh
Habitat condition - area affected by Ndep:	Habitat parcel 1: good
Limitation(s):	Habitat parcel 1: most of the stretch was surveyed from around the marina, due to sinking muds preventing access to most of the site.
Habitat sensitivity - Area affected by Ndep:	No sensitive species

Assessment

Table 6.161 River Medway and Marshes, Wouldham LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 24.62 DM: 23.08 DS: 23.92
Operation - Ndep increase (max for site) kg N/ha/yr	0.85
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.23
Operation - increase over 0.4 kg N/ha/yr	0.45
Operation - impact extent (ha)	6.65
Operation - impact extent (% of site)	3.38
Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required
Impact level	No change

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.83.1 The increase in N deposition (DS-DM) is 0.85kg N/ha/yr. The modelling was undertaken using an assumption that the most sensitive habitat present was neutral grassland with a LCL of 20kg N/ha/yr. The increase in N deposition is 4.2% of this LCL.
The LWS is designated for grazing marsh, salt marsh and reed bed and their importance for birds. The APIS website (CEH, 2022) provides a CL range for coastal and floodplain grazing marsh and for salt marsh of 20-30kg N/ha/yr but acknowledges the lack of experimental studies into N deposition effects on these habitats. However, N deposition is likely to be less important than nutrient enrichment via fertiliser wash off into drainage channels and nutrient loadings from river and tidal inputs. Aerial imagery indicates that much of the NAA overlaps with the River Medway itself, which is not a nitrogen-sensitive habitat. The maximum extent of the NAA is estimated at 6.65ha (including the part overlapping the river), which is approximately 3.4% of the site. Given the type of habitat and the limited extent of NAA, there is predicted to be no change in vegetation composition and no impact on the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6.84 River Medway Between Cuxton and Temple Marsh LWS

Baseline

Table 6.162 River Medway Between Cuxton and Temple Marsh LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	443_LWS, 444_LWS, 442_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	93.75
Site Description - desk study:	The site was designated in 2001. as River Medway between Cuxton and Temple Marsh LWS, (TM724 672) with interest features comprising the River Medway, relict saltmarsh, gazing marshes, a reedbed on the southern side of the river, and, east of the M2 crossing on the north side of the river, chalk scrub and grassland in a former cement works. The designated land lying within the NAA includes the grazing marsh north of the railway. The LWS description states that 'the grazing marsh north of the railway is low-lying and brackish, with standing water in winter and several pools and dykes. This, and the grassland south of the railway, is rather species-poor, but the abundant hairy buttercup (*Ranunculus sardous*), together with greater sea-spurrey (*Spergularia media*) and sea-milkwort (*Glaux maritima*) indicate their salinity. Sea clover (*Trifolium squamosum*) (County Scarce) has been recorded here in the past and is likely still to be present. Bird's-foot-trefoil (*Lotus corniculatus*) is frequent in drier areas. Meadow barley (*Hordeum secalinum*), fern-grass (*Catapodium rigidum*) and a range of other grasses occur. Water plants include thread-leaved water-crowfoot (*Ranunculus trichophyllus)*, fennel pondweed (*Potamogeton pectinatus*) and sea club-rush (*Bolboschoenus maritimus*). Marsh mallow (*Althaea officinalis*) (Nationally Scarce) is occasional near the sea wall.' A small strip of coastal saltmarsh also lies within the NAA. The LWS description states that 'saltmarsh occurs as a narrow strip on the north side near the creek and in patches along the shore and more extensively on Borstal Marsh and Wouldham Marsh on the southern side. It is dominated by common saltmarsh-grass (*Puccinellia maritima*) with abundant sea-milkwort. Other typical saltmarsh plants include sea club-rush, sea aster (*Aster tripolium*), sea arrowgrass (*Triglochin maritima*), annual sea-blite (*Suaeda maritima*), English scurvy-grass (*Cochlearia anglica*) and a small colony of glasswort (Salicornia sp.). More marsh mallow occurs on Wouldham Marsh, while sea barley (*Hordeum marinum*) (Nationally Scarce) is locally abundant on the track beside the sea wall. Sea lavender (*Limonium vulgare*) has been recorded on Borstal Marsh.' MAGIC 2022 shows the southern field (Habitat parcel 2) as coastal grazing marsh.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	06/02/21, 05/04/21 and 07/07/22, 26/07/22
Field survey habitat parcel	Habitat parcel 1 (northern field): A mosaic of grassland, some rabbit grazed and some with a taller sward and significant encroachment of buddleia, elder and burdock. This is species

descriptions:	poor grassland with less than nine species per square metre. The sward height varies from less than 7 cm to 1.5 m There is a large patch of nettle some 50 x 60 m in size. Rabbit activity is patchy across the area with most grazing taking place at the top of the field. This area was previously managed by cutting and now appears to be neglected. Only the rabbits maintain the short sward. Habitat parcel 2 (southern field): This very flat area is a mosaic of creeping bent dominated grassland and saline pools some dried up and some with water. There is clear evidence of cattle poaching the bare ground and cattle are present in the next field. There are some halophytes including halberd orache, greater sea spurrey, saltmarsh rush, sea aster and sea club rush. However, these are mainly confined to the salty pools and the edges of the water courses. The water is not flowing and appears to be either remnant of inundation or due to the fluctuating tidal water table. Where there has been inundation and then dried out the area is devoid of plants. This field contains some large patches of bare ground, possibly the result of hyper salinity. Habitat parcel 3 (hedgerow between Habitat parcel 1 and Habitat parcel 2): This shrubby hedgerow is overgrown and unmanaged and will eventually turn into a line of trees. It is dominated by hawthorn and is on a steep slope with mainly bare ground with frequent nettle. No AWIs present. The species list and condition assessment have been done. Habitat parcel 4. North bank of river, east of bridge. This is salt marsh comprising a mosaic of frequent sea aster, orache and abundant common salt marsh grass with occasional common cord grass, which becomes dominant at the eastern end of the Habitat parcel. Habitat parcel 5. north bank of river, west side of bridge. Formerly freshwater lagoons and grassland, but a high tide breached the sea wall in April 2022 killing off all the vegetation. Habitat is a shallow waterbody partially dry; vegetation is sparse. Salt marsh vegetation is now developing and where present has frequent orache and annual sea-blite, occasional aster. Habitat parcel 6: south side of river, west of bridge. A band of salt marsh with sea club rush dominant towards the water's edge, while sea purslane and club rush generally co-dominant towards the centre and a band dominated by sea couch on the landward side. Litter is very abundant along the strand line. Habitat parcel 7: south side of river, west of bridge. This was a band of mixed scrub on top of the bank bordering the saltmarsh, with diverse woody species. The scrub had a graded edge, transitioning in height from scrub to rough grassland, then down a bank to the saltmarsh. Shrubs present included frequent blackthorn, hawthorn, field maple, grey willow

	and wild privet; wayfaring tree was occasional, and buddleia was rare. The ground layer had locally abundant ivy.
Lichens:	No suitable lichen trees and/or lichens
Vegetation gradient:	No vegetation gradient observed in any of the 7 Habitat parcels.
Notes on active management (field survey observations):	Habitat parcel 1 (northern field) Surveyors were informed by the landowner that area had been regularly mowed until 2 years ago. No current mowing but grazing by rabbits preventing encroachment of scrub. Habitat parcel 2 (southern field) grazed by cows. Habitat parcel 3 (hedgerow) unmanaged. Habitat parcel 4 (saltmarsh) no direct management (indirect management due to embankment); Habitat parcel 5: The surveyors were informed by a local inhabitant during the survey that there were freshwater lagoons and reedbed but in April 2022 a high tide breached the sea wall, so the lagoons have become saline and are now flooding at every high tide. Salt marsh is expected to gradually develop. Habitat parcel 6: Saltmarsh squeezed by adjacent bank. Habitat parcel 7: no management observed.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1 (northern field). Mowing. Without rabbit grazing grassland habitat would become overrun with scrub. Cutting back of tall herbs would be beneficial. Habitat parcel 2 (southern field). As this field already has saline influence, it would be a good field to target for inland saltmarsh creation. Habitat parcel 3 (hedgerow) recommend management for nature conservation. Habitat parcel 4: Not required (saltmarsh). Habitat parcel 5: allow the natural development of saltmarsh at this location; Habitat parcel 6: remove litter. Habitat parcel 7: remove fly tipping.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2021 survey at the grazing marsh identified lack of management of the site, which is becoming invaded by ruderal vegetation and at the saltmarsh it identified urban littering and limited inundation. Habitat parcel 1 (northern field) lack of management is a threat. Habitat parcel 2 (southern field) poaching from cows and large patches of bare ground/dead vegetation, possibly the result of hyper salinity. Habitat parcel 3 (hedgerow): lack of management. Habitat parcel 4: There is lack of transitional saltmarsh habitats due to an embankment 'squeezing' the saltmarsh habitat. Habitat parcel 5: the development of saltmarsh is dependent on willingness to have this habitat. Habitat parcel 6: The habitat is constrained by the riverbank and litter is frequent.

Ellenberg values:	Habitat parcel 1 (northern field): min 3, max 9, mean 5.95. Habitat parcel 2 (southern field): min 4, max 7, mean 5.82. Habitat parcel 3 (hedgerow) min 5, max 8, mean 6.3. Habitat parcel 4: min 4, max 8, mean 6.22. Habitat parcel: 5 min 5, max 8 and mean 6.33. Habitat parcel 6: min 4, max 8, mean 6.17. Habitat parcel 7: min 3, max 8, mean 5.94. Habitat parcel 7: min 3, max 8, mean 5.91.
Ellenberg value score 4 and below:	Habitat parcel 1 (northern field): Species with EV4 are: common bent, hedge bedstraw, black medick, and marjoram. Species with EV3 are: upright brome and squirrel tail fescue. Habitat parcel 2 (southern field): soft rush EV4 Transect 3 (hedgerow); no species with EV 4 or less. Habitat parcel 3 (hedgerow) no species with EV 4 or less. Habitat parcel 4: Sea plantain, EV4. Habitat parcel 5: no species with EV4 or less. Habitat parcel 6: Sea plantain, EV4. Habitat parcel 7: common vetch, EV4; This was a band of mixed scrub on top of the bank bordering the saltmarsh, with diverse woody species. The scrub had a graded edge, transitioning in height from scrub to rough grassland, then down a bank to the saltmarsh. Shrubs present included frequent blackthorn, hawthorn, field maple, grey willow and wild privet; wayfaring tree was occasional, and buddleia was rare. The ground layer had locally abundant ivy.
Habitat type (UKHab category):	Habitat parcel 1 (northern field) g2 - calcareous grassland; secondary codes 15 (habitat mosaic: tall herb); 48 (non-native); 10 (habitat mosaic: scattered); 62 (management: other grazed); 77 (management: neglected). Habitat parcel 2 (southern field) g3 - neutral grassland; secondary codes 25 (habitat complex: coastal floodplain grazing marsh), 29 (habitat complex: inland saltmarsh); 138 (environmental qualifiers: saline influence); 121 (environmental qualifiers: waterlogged). Habitat parcel 3 (hedgerow), h2. - hedgerows. Habitat parcel 4: t2a - Coastal saltmarsh; Habitat parcel 5: t2a - Coastal saltmarsh; Habitat parcel 6: t2a - Coastal saltmarsh; Habitat parcel 7: h3h - Mixed scrub
Habitat condition - area affected by Ndep:	Habitat parcel 1 (northern field): good, passing 6 out of 7 grassland criteria. Habitat parcel 2 (southern field) good, passing 6 out of 7 criteria. Habitat parcel 3 (hedgerow) good condition. Habitat parcel 4 (saltmarsh): moderate (14 points); Habitat parcel 5: no condition assessment was done as habitat in a state of transition as it is only 3 months old following a sea-wall breach. Habitat parcel 6: moderate (14 points); Habitat parcel 7 (mixed scrub): good.
Limitation(s):	None, except for Habitat parcel 5 where it was not possible to walk the suggested transect as it traversed a shallow lagoon with areas of deep mud.

Habitat sensitivity - Area affected by Ndep:	Two fields north of the railway line are considered together, as follows: Habitat parcel 1 is the field nearest the road, and Habitat parcel 2 is the field furthest from the road: Survey of both Habitat parcels included species with every EV between 4 and 9 inclusive. No AWsI were recorded in either field. The 1885-1900 maps shows no woodland present at that time and it is likely these fields have been unwooded since at least that period. In Habitat parcel 1, nettle EV8 was the most frequent in the field layer; a nitrophile known to respond to increased nitrogen (Pitcairn et al., 2006) and is an indicator of nitrogen enrichment. Dog's mercury EV7 was locally abundant; and is known to respond to increased nitrogen. Also frequent in Habitat parcel 1 was rough meadow-grass, EV6, a nitrophile known to respond to increased nitrogen, and Yorkshire fog EV5, a nitrophile that has potential to respond to increased nitrogen. Habitat parcel 2 had saline influence and had abundant creeping-bent EV6, a nitrophile which can invade rapidly, and occasional Yorkshire fog, EV5, a nitrophile that has the potential to increase (Pitcairn et al., 2006). The mean EV for Habitat parcel 1 was 5.95, which was higher than the mean for Habitat parcel 2 (5.82). Although it had a higher mean, Habitat parcel 1 had more nitrogen sensitive species (6 species recorded) than Habitat parcel 2 (only soft rush recorded). Along the hedgerow separating the two fields, common nettle was abundant and the nitrophile ground ivy EV7 was frequent. The three saltmarsh Habitat parcels were surveyed, Habitat parcels 4, 5 and 6. Only one species with EV4 was recorded, sea plantain, where it was rare in Habitat parcels 4 and occasional in Habitat parcel 6. Pitcairn et al (2006) does not have a nitrophobe/nitrophile classification for saltmarshes. The APIS website states that there are very few studies of N deposition effects on saltmarshes, but work undertaken in the Netherlands suggest salt marsh vegetation is N limited (Mitsch & Gosselink, 2000), which would make it vulnerable to eutrophication effects from atmospheric N deposition. APIS also states that 'overall N deposition is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs. Recent review by Boorman & Hazelden (2012) suggests that the pioneer low – mid saltmarsh areas are more resilient to N deposition than the mature upper areas. Any effects of N deposition are likely to be found in the tall vegetation of the closed upper marsh communities where interspecific competition is greatest. These more mature areas may also be subject to direct run-off from the surrounding catchment. Biogeochemical cycling of nutrients through microbial activity is quite rapid in this open system and N losses via denitrification may be considerable (Barnes & Owen 1998)' If this is applies to the River Medway LWS, Habitat parcel 5 is in its pioneer stage, and therefore the most resilient to N deposition, whereas the saltmarsh present in

	Habitat parcels 4 and 6 is more mature, and in a higher tidal zone, and subject to direct run-off from the surrounding catchment, and likely to make it more vulnerable to nutrient loading.

Assessment

Table 6.163 River Medway Between Cuxton and Temple Marsh LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 84.13 DM: 69.89 DS: 74.33
Operation - Ndep increase (max for site) kg N/ha/yr	4.44
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	22.2
Operation - increase over 0.4 kg N/ha/yr	4.04
Operation - impact extent (ha)	19.58
Operation - impact extent (% of site)	20.89
Operation - impact duration (years until emissions DS = DM at opening yr)	>15

Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.84.1 The maximum increase in N deposition (DS-DM) is 4.44kg N/ha/yr. The NAAs encompass the river, saltmarsh, grazing marsh, grassland, hedgerow and scrub habitats on both sides of the river adjacent to the M2 bridge and to the south of the A228. A LCL for neutral grassland (low and medium altitude hay meadows) of 20kg N/ha/yr has been applied and the increase in N deposition is 22.2% of this LCL. No vegetation gradients were identified and no suitable lichen trees or lichens were identified.

The NAA in the north-western part of the site is due to the A228 and supports calcareous grassland closest to the road (Habitat parcel 1). This grassland is undergoing succession to rank grassland and scrub, with a large patch of nettle indicating nutrient enrichment. However, a short sward is maintained in places by rabbit grazing and species with possible sensitivity to nitrogen were recorded, including hedge bedstraw, black medick, marjoram upright brome and squirrel-tail fescue. In this part of the site, increased N deposition has potential to cause the loss of these species if they are out-competed by rank grassland and scrub species.

The adjacent neutral grassland NAA (Habitat parcel 2) had abundant creeping bent and occasional Yorkshire fog. There was only one species present with an EV value of 4 or less, soft rush (EV4) and the presence of halophytes indicates a saline influence. This area is further from the road than the calcareous grassland and the two grassland areas are separated by a hedgerow. The hedgerow and the neutral grassland area are not considered particularly sensitive to increased N deposition.

The NAA either side of the motorway bridge includes the river itself (which is not a nitrogen-sensitive habitat), areas of saltmarsh (Habitat parcels 4-6) and mixed scrub (Habitat parcel 7). The salt marsh had only one species present with an EV value of 4 or less, sea plantain (EV4). The APIS website (CEH, 2022) provides a CL range for coastal and floodplain grazing marsh and for salt marsh of 20-30kg N/ha/yr but acknowledges the lack of experimental studies into N deposition effects on these habitats. N deposition is likely to be less important than nutrient enrichment via fertiliser wash off into drainage channels and nutrient loadings from river and tidal inputs. Therefore, the saltmarsh component of the NAA is not considered sensitive to increased N deposition. The mixed scrub had a locally abundant ground layer of ivy, one species with an EV value of 4 or less, common vetch (EV4) and two with an EV value of 3, Ploughman's spikenard and hawkweed oxtongue. The scrub habitat and these species are not considered key reasons for designation of the LWS

but increased N deposition could increase the growth and distribution of nitrophilic plant species such as nettle and ivy. Although the total area of the NAA represents 20.9% of the designated area, this includes the river itself which is not sensitive to nitrogen. The range of habitats within the NAA is such that any subtle changes in species composition are unlikely to affect site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible.

Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.85 River Shuttle SINC

Baseline

Table 6.164 River Shuttle SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	593_LWS, 607_LWS, 608_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	8.05
Site Description - desk study:	The description states the following: 'River Shuttle SINC is of Borough Grade 1 importance. Summary: One of Bexley's most important rivers, with several regionally important plants and supporting varied populations of fish, birds and invertebrates. Site Description: The River Shuttle is second in importance to the River Cray in Bexley. A large proportion of the river has been straightened, but in recent years stretches of the river have been naturalised. The rivers supports a good wetland flora, including curled pondweed (*Potamogeton crispus*), cyperus sedge (*Carex pseudocyperus*), arrowhead (*Sagittaria sagittifolia*), common club-rush (*Schoenoplectus lacustris*), flowering-rush (*Butomus umbellatus*), brooklime (*Veronica beccabunga*), water forget-me-not (*Myosotis scorpioides*), square-stalked St John's-wort

	(*Hypericum tetrapterum*) and sea club-rush (*Bolboschoenus maritimus*).The rivers support varied populations of fish, including chub and bullhead, the latter a UK BAP priority species. Breeding birds include kingfisher. The river corridor is used by grey wagtail, greenfinch, blackcap, siskin and heron. Habitat suitable for water voles is present along the river and anecdotal evidence suggests they are present in small numbers. The site includes a small woodland dominated by mature oak (*Quercus robur*) with elm (*Ulmus glabra*) and associated semi-improved grassland. The woodland supports purple hairstreak butterflies. The small grassland area supports London rare species narrow leaved bird's-foot trefoil (*Lotus glaber*) and hare's-foot clover (*Trifolium arvense*), as well as thyme-leaved speedwell (*Veronica serpyllifolia*) and early hair-grass (*Aira praecox*). '
Site Condition - As described in citation/by site manager:	The description states the following: 'Status Change (published December 2016): Previously part of BxBII09 River Shuttle and Wyncham Stream. The River Shuttle has been upgraded to Borough Grade I site. The river has undergone significant improvements during past several years and further work is planned through River Shuttle Restoration Action Plan (LB Bexley). Stretches of the river are now naturalised and re-planted, and they support good quality wetland and marginal habitats. In its current condition, together with its function as an important corridor linking several other SINC sites, the River Shuttle fits the criteria for Borough Grade I site. Other observations (published December 2016): A few plants of Himalayan balsam were recorded near the foot bridge across A2. Removal is strongly advised before the balsam spreads. '
Dates surveyed (2021 and 2022):	27 July 2022
Field survey habitat parcel descriptions:	The NAA included a part channelled and culverted stream to 3 m wide and shallow on the day of survey (27 July 2022) with clear water and stony river sediments. The stream flowed along a concrete channel to 10 m wide and 3 m high. The bankside vegetation included sycamore, ash, cherry, blackthorn, willow, plum, field maple as both trees and saplings. The water was clear but there were no aquatic or emergent plants. Himalayan balsam was occasional and wall cotoneaster was rare. After emerging from the culvert beneath road the stream was slow flowing over finer sediments and was no longer canalised, although the channel was still modified. Here the bankside vegetation had frequent ivy and occasional pendulous sedge and bramble. Along most of the transect there was a dense canopy of sycamore and ash with frequent hawthorn and occasional willow in the understorey. Evergreen oak present as saplings. Italian alder and white polar trees were rare in the

	canopy. There was very little Himalayan balsam in this stretch but where it opens out at each end where the stream is culverted, Himalayan balsam is present.
Lichens:	No lichens present on suitable trees
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	There was no apparent management.
Notes on required or beneficial management (field survey observations):	Remove the non-natives species: wall cotoneaster, virginia creeper, Himalayan balsam. Remove and gradually replace the abundant sycamore with native species e.g., crack willow.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The stretch covered in the NAA has a number of invasive plants which will compete with the native species.
Ellenberg values:	min 3, max 9, mean 6.15.
Ellenberg value score 4 and below:	EV4: yarrow, silver birch, wall cotoneaster, evergreen oak and pedunculate oak. EV3: bracken
Habitat type (UKHab category):	w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Moderate (score 26)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of River Shuttle SINC recorded species with every EV between 3 and 9 inclusive. No AWIs or nitrophobes were recorded. Five nitrophiles were recorded, the most frequent of which was frequent ivy, EV6. Bramble EV6 was occasional; this species known to respond to increased nitrogen (Pitcairn et al.,2006). The nitrophile false oat-grass EV7, was rare and nettle, EV8, an indicator of nutrient enrichment was also rare. The species with the highest EV, (9) is broadleaved dock, an indicator of nutrient enrichment.

Assessment

Table 6.165 River Shuttle SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 49.29 DM: 49.07 DS: 49.57
Operation - Ndep increase (max for site) kg N/ha/yr	0.5
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.03
Operation - increase over 0.4 kg N/ha/yr	0.1
Operation - impact extent (ha)	0.09
Operation - impact extent (% of site)	1.13
Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.85.1 The increase in N deposition (DS-DM) is 0.50kg N/ha/yr. The NAA supports predominately broadleaved deciduous woodland and a small area of the River Shuttle with associated aquatic flora. A LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been applied and the increase of N deposition is 5% of this LCL.
The site investigation did not record any lichen growth on suitable trees or any existing gradient in the vegetation. No AWIs or nitrophobes were recorded. Five nitrophiles were recorded, including the frequently recorded common ivy (EV6) and occasional bramble (EV6). Five species with EV4 were recorded including INNS wall cotoneaster, and one species of EV3, bracken. It was noted that there was occasional INNS Himalayan balsam present and no obvious management of the NAA The presence of INNS is likely to pose the biggest threat to site integrity and left unmanaged will likely spread.
Additional N deposition onto 1.1% of the SINC has the potential to increase the growth and distribution of nitrophilic species but given the lack of sensitive species, the proportion of the site affected and that some of the NAA includes the river, which is not sensitive to N deposition, no impact on site integrity is anticipated. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible impact level on a site of county value could be either neutral or slight. Given the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.86 Romford to Harold Wood Railsides SINC

Baseline

Table 6.166 Romford to Harold Wood Railsides SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	527_LWS, 751_LWS
Resource importance:	County
Overlapping site:	No

Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	28.36
Site Description - desk study:	Havering's rail sides form a network of valuable undisturbed habitats, acting as corridors to facilitate the movement of wildlife around the borough. The total area of rail side land makes them a significant habitat in their own right. There are good areas of habitat along all the borough's railways, with cuttings and embankments generally supporting the widest and best habitats. Most of the rail sides are wooded, with ash (*Fraxinus excelsior*), oak (*Quercus robur*), and sycamore (*Acer pseudoplatanus*) dominating different sections. Scrub of elm (*Ulmus spp.*) and hawthorn (*Crataegus monogyna*) is also widespread. Wooded sections of trackside include the cuttings at Heath Park, the embankment at Harold Park, and the cutting by Gidea Park station. Rough grassland and tall herbs are also widespread, mainly dominated by false oat-grass (*Arrhenatherum elatius*), nettle (*Urtica dioica*), rosebay willowherb (*Chamerion angustifolium*), cow parsley (*Anthriscus sylvestris*) and Chinese mugwort (*Artemisia verlotiorum*), often intermingled with bramble (*Rubus fruticosus agg.*). This rough land habitat can be found in the cuttings at Heath Park and around Harold Wood. Swamp of common reed (*Phragmites australis*) and great reedmace (*Typha latifolia*) occurs in one wet area on the face of a cutting near Gidea Park station.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.167 Romford to Harold Wood Railsides SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 66.45 DM: 64.03 DS: 66.4

Operation - Ndep increase (max for site) kg N/ha/yr	2.37
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	23.75
Operation - increase over 0.4 kg N/ha/yr	1.97
Operation - impact extent (ha)	1.1
Operation - impact extent (% of site)	3.88
Operation - impact duration (years until emissions DS = DM at opening yr)	6
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.86.1 No survey was undertaken in 2022 as access was not possible for safety reasons. The SINC is a linear site, encompassing embankments on both sides of the railway which support woodland, scrub and rough grassland. The NAA is at the south-western end of the designation, extending either side of where the railway embankments pass beneath the A127.

The increase in N deposition (DS-DM) is 2.37kg N/ha/yr, which is 23.7% of the LCL of 10 kg N/ha/yr for broadleaved deciduous woodland.

The NAA is estimated at 1.10 ha (3.9% of the SINC), but some of this area encompasses the A127 and the railway itself, so the NAA and the vegetated habitat is smaller than this. Therefore, there is not considered to be an effect on site integrity as a result of increased N deposition, despite the high predicted deposition rates.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 6 years, so is assessed as temporary and theoretically reversible.

Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible adverse impact level on a site of county value could be either neutral or slight. Given the small area affected and the precautionary measures adopted throughout this assessment, this is considered to result in a neutral effect (not significant).

6.87 Shales More AW

Baseline

Table 6.168 Shales More AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	74_AW_LWS
Resource importance:	National
Overlapping site:	Shales More LWS
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	10.41
Site Description - desk study:	Shales More is an AW which lies along the northern side of the M25. The inventory of Ancient Woodland for England describes the site as 'ancient and semi-natural woodland'. The AW boundary is concurrent with that of Shales More LWS. The LWS citation describes the site as mainly ancient woodland sloping down to a stream which forms part of the western boundary and is bisected by a narrow ride. A small area of secondary wood is present on the extreme southern edge. The ancient woodland comprises a mixed canopy of predominantly ash standards, alder carr of both coppice and standards near the streamside and Hornbeam coppice upslope. The ground flora typically contains bramble, common nettle and dog's mercury under a scrubby understorey of hawthorn and blackthorn. Bluebell is also found in the ground flora of the drier areas. Forming a ground flora distinct from the rest of the wood, ransoms, pendulous sedge and male-fern are characteristically found in the poorly drained alder carr. In addition, very localised patches of opposite-leaved golden-saxifrage an Essex Red Data List species are found. A number of notable mosses and liverworts have been recorded.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	26/07/22

Field survey habitat parcel descriptions:	This woodland lies in a shallow valley. Its canopy was dominated by mature ash standards over an understorey of frequent old hazel and hornbeam coppice with occasional field maple and elder. The ground layer had abundant ground ivy and bluebell, plus frequent wood false brome, dog's mercury, bracken and nettle. The woodland is heavily used by deer, with no woodland regeneration observed. Signs of ash dieback were widespread, including fallen trees. Dead wood was abundant. Three AWIs were present in the field layer: bluebell, pendulous sedge and opposite-leaved golden saxifrage. There were no signs of nutrient enrichment, despite the adjacent arable farmland. A footpath runs between road verge and the woodland but it does not appear to be well used. The two-metre-wide stream towards the centre of the woodland was partially dry on the date of survey (26/07/22), without flow.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed. Nettle was frequent but not dominant, with patches occurring throughout the wood.
Notes on active management (field survey observations):	Old coppice was present, but there were no signs of recent management
Notes on required or beneficial management (field survey observations):	There is an absence of natural woodland regeneration which suggests a need for deer control and supplementary planting. A management strategy is required on how best to deal with ash dieback e.g planting of native trees and fencing to restrict access and allow dead/dying trees to remain standing as long as possible to provide habitat for woodland species while potentially planted trees establish.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	On the date of survey (26/07/22) the stream along the western boundary of the wood was partially dry and without flow. Heavy trampling by deer around the stream had left a lot of bare ground. Since ash is dominant in the canopy, ash dieback will result in almost the entire loss of the canopy in the near future.
Ellenberg values:	min 3, max 8, mean 6.15.
Ellenberg value score 4 and below:	Fleabane EV4; Bracken, EV3
Habitat type (UKHab category):	w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Moderate (score 27)
Limitation(s):	None

Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 3 and 8 inclusive. Three field layer AWIs were present all with EV5 or above, indicating they do not have sensitivity to nitrogen. No nitrophobes were present. Six nitrophiles were present, which may increase in response to increase N deposition, of which five had a DAFOR score of 'frequent' or above: ground ivy, EV7, abundant; bluebell, EV6, abundant; dog's mercury, frequent, EV7; bramble, EV6, frequent; and common nettle, EV8, an indicator of nutrient enrichment (Pitcairn et al.,2006). Yorkshire fog, EV5, a nitrophile which has the potential to increase, was rare. Two other indicators of nutrient enrichment, EV8, were present, cleavers and hedge woundwort.

Assessment

Table 6.169 Shales More AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 60.2 DM: 57.84 DS: 58.51
Operation - Ndep increase (max for site) kg N/ha/yr	0.67
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.7
Operation - increase over 0.4 kg N/ha/yr	0.27

Operation - impact extent (ha)	0.39
Operation - impact extent (% of site)	3.75
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.87.1 Shales More AW is entirely within the LWS, with a narrow strip in the middle of the LWS that is not AW. The increase in N deposition (DS-DM) is 0.67kg N/ha/yr. The NAA supports broadleaved deciduous woodland which has a LCL of 10kg N/ha/yr and the increase in N deposition is 6.7% of this LCL.

The site investigation did not record any lichen growth on suitable trees or any existing gradient in the vegetation. No nitrogen sensitive AWI species or nitrophobic species were identified. Fleabane (EV4); and bracken (EV3) were the only species recorded with an Ellenberg value under 5.

Six nitrophiles were present, two of these were abundantly recorded; ground ivy (EV7, can spread rapidly with increased nitrogen) and bluebell (EV6, may respond to increased nitrogen in moist soils), with a further two, bramble and dog's-mercury, frequently recorded and will respond to increased nitrogen. Bramble and bluebell, both of which have EV of 6 and are known to respond to increased N are abundant in the field layer. Dog's-mercury (EV7) is also a nitrophile and is frequent in the ground layer. Species such as ground ivy, common nettle and cleavers could also increase in response to increased N deposition. The species composition at the site could change in terms of the relative proportions of species, but it is of note that the typical woodland ground flora species recorded at this site, such as bluebell and dog's-mercury are nitrophiles and could also increase in response to increased nitrogen. Therefore, these typical species are not predicted to be lost as a direct result of increased N deposition and it is unlikely that there will be a perceptible change in vegetation composition.

The woodland canopy is dominated by ash and it was noted that with the presence of ash die back, the canopy is at risk of loss in the near future. Deer trampling and grazing on the site was noted to be restricting the ground flora growth and likelihood of natural woodland regeneration. No current management was observed. The presence of ash die back and deer are likely the current biggest threats to integrity of this site. Given the lack of nitrogen sensitive species and that the

NAA is only 7.8% of the site, there is unlikely to be an impact on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.88 Shales More LWS

Baseline

Table 6.170 Shales More LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	74_AW_LWS
Resource importance:	County
Overlapping site:	Shales More AW
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	10.92
Site Description - desk study:	Shales Moor is an AW which lies along the northern side of the M25. The inventory of Ancient Woodland for England describes the site as 'ancient and semi-natural woodland'. The AW boundary is concurrent with that of Shales More LWS. The LWS citation describes the site as mainly ancient woodland sloping down to a stream which forms part of the western boundary and is bisected by a narrow ride. A small area of secondary wood is present on the extreme southern edge. The ancient woodland comprises a mixed canopy of predominantly ash standards, alder carr of both coppice and standards near the streamside and hornbeam coppice upslope. The ground flora typically contains bramble, common nettle and dog's mercury under a scrubby understorey of hawthorn and blackthorn. Bluebell is also found in the ground flora of the drier areas. Forming a ground flora distinct from the rest of the wood, ransoms, pendulous sedge and male-fern are characteristically found in the poorly drained alder carr. In addition, very localised patches of opposite-leaved golden-saxifrage an

	Essex Red Data List species are found. A number of notable mosses and liverworts have been recorded.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	26/07/22
Field survey habitat parcel descriptions:	This woodland lies in a shallow valley. Its canopy was dominated by mature ash standards over an understorey of frequent old hazel and hornbeam coppice with occasional field maple and elder. The ground layer had abundant ground ivy and bluebell, plus frequent wood false brome, dog's mercury, bracken and nettle. The woodland is heavily used by deer, with no woodland regeneration observed. Signs of ash dieback were widespread, including fallen trees. Dead wood was abundant. Three AWI were present in the field layer: bluebells, pendulous sedge and opposite leaved golden saxifrage. There were no signs of nutrient enrichment, despite the adjacent arable farmland. A footpath runs between the road verge and wood but does not appear to be well used. The two-metre-wide stream towards the centre of the woodland was partially dry on the date of survey (26/07/22), without flow.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed. Nettles were frequent but not dominant, with patches occurring throughout the wood.
Notes on active management (field survey observations):	Old coppice was present, but there were no signs of recent management
Notes on required or beneficial management (field survey observations):	There is an absence of natural woodland regeneration which suggests a need for deer control and supplementary planting. A management strategy is required on how best to deal with ash dieback e.g., planting of native trees and fencing to restrict access and allow dead/dying trees to remain standing as long as possible to provide habitat for woodland species while potentially planted trees establish.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	On the date of survey (26/07/22) the stream along the western boundary of the wood was partially dry and without flow. Heavy trampling by deer around the stream had left a lot of bare ground. Since ash is dominant in the canopy, ash dieback will result in almost the entire loss of the canopy in the near future.
Ellenberg values:	min 3, max 8, mean 6.15.

Ellenberg value score 4 and below:	Fleabane EV4; Bracken, EV3
Habitat type (UKHab category):	w1g - Other woodland; broadleaved
Habitat condition - area affected by Ndep:	Moderate (score 27)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 3 and 8 inclusive. Three field layer AWIs were present all with EV5 or above, indicating they do not have sensitivity to nitrogen. No nitrophobes were present. Six nitrophiles were present, which may increase in response to increase N deposition, of which five had a DAFOR score of 'frequent' or above: ground ivy, EV7, abundant; bluebell, EV6, abundant; dog's mercury, frequent, EV7; bramble, EV6, frequent; and common nettle, EV8, an indicator of nutrient enrichment (Pitcairn et al.,2006). Yorkshire fog, EV5, a nitrophile which has the potential to increase, was rare. Two other indicators of nutrient enrichment, EV8, were present, cleavers and hedge woundwort.

Assessment

Table 6.171 Shales More LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 60.2 DM: 57.84 DS: 58.51

Operation - Ndep increase (max for site) kg N/ha/yr	0.67
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.7
Operation - increase over 0.4 kg N/ha/yr	0.27
Operation - impact extent (ha)	0.39
Operation - impact extent (% of site)	3.58
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.88.1 The increase in N deposition (DS-DM) is 0.67kg N/ha/yr. The NAA supports broadleaved deciduous woodland which has a LCL of 10kg N/ha/yr and the increase in N deposition is 6.7% of this LCL.

The site investigation did not record any lichen growth on suitable trees or any existing gradient in the vegetation. No nitrogen sensitive AWI species or nitrophobic species were identified. Fleabane (EV4); and bracken (EV3) were the only species recorded with an Ellenberg value under 5.

Six nitrophiles were present, two of these were abundantly recorded; ground ivy (EV7, can spread rapidly with increased nitrogen) and bluebell (EV6, may respond to increased nitrogen in moist soils), with a further two, bramble and dogs' mercury, frequently recorded and will respond to increased nitrogen. Species such as ground ivy, common nettle and cleavers could also increase in response to increased N deposition. The species composition at the site could change in terms of the relative proportions of species, but it is of note that the typical woodland ground flora species recorded at this site, such as bluebell and dog's-mercury are nitrophiles and could also increase in response to increased nitrogen. Therefore, these typical species are not predicted to be lost as a direct result of increased N deposition and it is unlikely that there will be a perceptible change in vegetation composition.

The woodland canopy is dominated by ash and it was noted that with the presence of ash dieback, the canopy is at risk

of loss in the near future. Deer trampling and grazing on the site was noted to be restricting the ground flora growth and likelihood of natural woodland regeneration. No current management was observed. The presence of ash dieback, and deer are likely the current biggest threats to integrity of this site.
Given the lack of nitrogen sensitive species and that the NAA is only 3.6% of the site, there is unlikely to be an impact on site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.89 Shorne and Ashenbank Woods SSSI

Baseline

Table 6.172 Shorne and Ashenbank Woods SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	370_AW, 232_SSSI, 233_SSSI_LWS_AW, 248_SSSI, 264_SSSI_LWS, 349_SSSI, 389_SSSI
Resource importance:	National
Overlapping site:	AW_Theme_ID_1486860 (Shorne Woods) AW, AW_Theme_ID1486951 AW, Shorne/Brewers Woods AW
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	197.44
Site Description - desk study:	The SSSI citation describes this site as forming a complex of ancient and plantation woodland and includes a variety of stand-types associated with Tertiary gravels, clays and sands. The site supports an important and diverse invertebrate fauna, especially beetles, true bugs and dragonflies. The woodland varies from pure sweet chestnut coppice, in places heavily invaded by sycamore, to a more mixed broadleaved community, consisting of mature oak, sweet chestnut, and hornbeam. The notified habitats of the site comprise the NVC woodland types W8 and W10.

Site Condition - As described in citation/by site manager:	The area of the site within 200m of the ARN comprises units 1, 2 and 4 of the SSSI. Unit 1 lies along the northern side of the A2 and is known as Brewers Wood; most of this unit comprises AW, except for an area in the far east of the unit. The condition of Unit 1 was assessed by NE (Oct 2010) as 'favourable', with the following comments: 'This is a relatively small part of the SSSI and although parts of the woodland have poor structural diversity, the composition of the canopy is characteristic of the woodland type, a fairly rich ground flora is present and there are features present which are likely to make the area of value for invertebrates. The condition of the habitat is good. The extent of woodland is being maintained. The woodland is largely made up by even-aged sweet chestnut coppice re-growth with frequent old standards of oak and sweet chestnut. Only a relatively small proportion is made up by open space or early growth stage woodland but there is good ride-edge structure of potential value for invertebrates. Overall structural diversity is appropriate for the woodland type although the eastern end of the wood might benefit from re-coppicing to break up the canopy. There is good representation of standing and lying dead wood and parts have a shrub layer provided by holly, birch and hawthorn. The ground flora is characteristic with many species typical of acid soils including wood sage, bracken, heath speedwell and woodbine. Wood spurge is frequent in places. There are some patches of (*Rhododendron ponticum*), particularly towards the eastern end but overall cover is within target levels. There is evidence of control measures in places. There are no indications of deer browsing and no evidence of constraints on tree regeneration'. Unit 2 is to the north of the A2 and includes Shorne Wood and Randall Wood; the unit comprises a mixture of AW and deciduous woodland, with an area of designated AW adjacent to the A2. Natural England's 2010 condition assessment for Unit 2 describes the site as a large block of woodland with a mixture of stand types and moderate structural diversity, much of which is made up by sweet chestnut coppice but there are also areas of wet woodland and extensive areas of recently established birch woodland on former clay workings. The assessment describes the unit as having a fairly rich ground flora and features present likely to make it of value for invertebrates. The ground flora is described as varied in relation to soil type and includes a range of characteristic species such as barren strawberry, bluebell, honeysuckle, nettle-leaved bellflower, wood sage, wood spurge and yellow pimpernel. There is acid grassland at Randall Heath, but this lies to the north beyond 200m of the ARN. Unit 4, Ashenbank Wood, is to the south of the A2. The area of AW lies at the south-west of the unit, on the edge of the 200m ARN buffer. The condition of Unit 4 was assessed by NE

	(Aug 2016) as 'unfavourable – recovering' with the following description: 'This unit has an open glade with bluebells, which is being encroached by grass, many woodland ground flora is being lost. The bluebells are not fully flowering due to open nature of the environment. The grassland includes; Yorkshire fog, rye grass, annual meadow-grass, rosebay willowherb and chickweed. The Ash saplings are disease-free. This unit would benefit from some oak planting to increase woodland flora. This was assessed as part of the field unit / Sussex Team Woodland Monitoring Project. KH/CF 23/08/2016'.
Dates surveyed (2021 and 2022):	21/05/22, 27-28/10/21, 6/6/22 and 28/06/22.
Field survey habitat parcel descriptions:	For the 2022 survey, Shorne and Ashenbank Wood SSSI was divided into eight Habitat parcels, which are described as follows: Habitat parcel 1: The woodland is a complex mosaic consisting of stands of hornbeam and oak plantation, circa 40 years old, dense stands of birch regeneration circa 5 years old, and mixed woodland of oak, hornbeam and birch. The ground undulates significantly probably from previous mining activities (sand and gravel). The raised areas are typically drier and the lower areas which have not become ponds or lakes are wetter. The clearly planted hornbeam and oak plantation (where the quadrat 1 was done) is well spaced healthy predominantly hornbeam with oak and a small amount of birch and ash. The field layer is often leaf litter with the predominant species being bluebell. The birch stands are a dense self-seeded monoculture of young trees growing to 3 + metres high, with DBH of 10-15cm. The main path, parallel and close to the road is steeply banked on each side with hornbeam predominating. Here there is significant bare ground with no leaf litter to a width of 20-30 metres. Habitat parcel 2: The habitat within this area is of mixed woodland, with nine canopy species sometimes dominated by stands of sweet chestnut. There is a rich and variable ground flora including some areas almost entirely dominated by ferns. Its undulating topography creates drier and wetter areas. The quadrat was sited in a lower wetter area. The main path, parallel and close to the road is steeply banked on each side with hornbeam predominating on bare ground. Here there is significant bare ground with no leaf litter to a width of 20-30 metres. Some of this is clearly human erosion from slides created on the steep banks although it appears other factors may contribute significantly to the bare ground. The land closest to the road has some semi mature oaks and the field layer is predominantly ivy. There is significant scattered litter from vehicles on the adjacent road affecting this area.

	Habitat parcels 3 and 4: This transect is accessed via a steep path up onto a raised area and is bisected by a road. The habitat is dominated by sweet chestnut coppice with some oak, hornbeam and sycamore, with occasional understorey of hazel and holly. The field layer is predominantly bluebell and bramble with some ferns. Several other AWIs are present but not in large numbers. The area is not very frequented by walkers and has few and narrow paths. There are no observed invasive plants, and there is no evidence of grazing or erosion. There were two quadrats done in this transect, one in each sector, as the transect is bisected by a road. The quadrats reflect that these areas are very much dominated by sweet chestnut and whilst there are areas of ground flora biodiversity they are not the norm. Habitat parcel 5: predominantly sweet chestnut coppice. Habitat parcel 6: This is a triangle of land, isolated on all sides by slip roads and a main road, and access is only possible by crossing one of these roads. The area is partially fenced, with native planting on the slopes outside of the fenced area contiguous with the road. These slopes have a quite rich flora. The area surveyed was the entirety of the fenced area. It is a fragment of the surrounding woodland, being dominated by sweet chestnut with some native species both as standards and understorey. There is a significant AW ground flora including wood anemone, and early purple orchid. There are unsurprisingly no paths and there is no evidence of animal activity. Significant threats are the very large amount of rubbish present, including large parts of cars, metal drums and an assortment of other rubbish. Habitat parcel 7: Old sweet chestnut coppice with some other canopy trees of oak and silver birch. Relatively diverse understory and diverse ground flora. Habitat parcel 8: Ancient Woodland with a mixed sweet chestnut oak and sycamore canopy, hawthorn and hornbeam understorey and mostly bramble ground flora. Wet in places and currently unmanaged.
Lichens:	No lichens on suitable trees on any of the eight Habitat parcels surveyed for this SSSI.
Vegetation gradient:	No vegetation gradient observed in any of the eight Habitat parcels.

Notes on active management (field survey observations):	Habitat parcels 1 and 2: The only observable management is path maintenance. Habitat parcel 3: Hedge protection, likely to be against rabbits. Habitat parcel 4: There is little apparent management, although fallen trees are cut up when blocking the path, and some trees are earmarked for felling. A worker that the surveyors met described how there is an active coppicing regime within Shorne Woods to provide biomass for the heating system at the information centre and also for external sale. There was no evidence of recent coppicing in Habitat parcels 3, 4 or 5 (transect 3). Habitat parcel 6: Due to its isolation by being enclosed by busy roads it is likely that this land parcel is rarely visited. There was clearly planting of hawthorn and dogwood etc in the past when the road was built, and the land separated from the main parcel of Shorne woods. What remains is predominantly sweet chestnut coppice circa 30: years old from older standards. The ground flora is surprisingly intact with little signs of nutrient enrichment and some AWI present including a healthy population of orchis macula. Habitat parcel 7. No active management but remnant of old sweet chestnut and birch coppice. Habitat parcel 8, No observable management noted during the survey, and not clearings observed and thick bramble understorey present. A Woodland Trust sign in Habitat parcel 8 stated that the " veteran trees are being managed by 'halo thinning'. This gradual process clears vegetation around veteran tree, increasing the light they receive and reducing competition from other trees. The aim is to free at least 5m surrounding or extending out from the crown of the trees."
Notes on required or beneficial management (field survey observations):	Habitat parcels 1 and 2: The areas of erosion close to the road might be controlled by signage, temporary fencing and planting. Invasive rhododendron and laurel should be controlled or removed. Bramble might be controlled. Habitat parcels 3 and 4 Suggested management would be a coppice rotation and gradual introduction of natives such as oak, hornbeam and hazel. Habitat parcels 6 and 7: Re-instatement of a coppice regime to open up field layer, which is currently densely shaded. Habitat parcel 8. Continuation of 'halo' thinning around veteran trees' as described under active management Shorne Wood Country Park Management Plan 2015-2020, includes a compartment summary providing compartment number, area, tree species and a long term management. However, there is no accompanying map showing the location of the compartments. Note also that the management plan is nearly 2 years out of date. It is unknown whether there is a current management plan.

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The SSSI is well used by members of the public and school groups, so will have associated pressures, including disturbance to wildlife and habitats, littering and dogs. The introduced sycamores were dominant in some areas. Habitat parcels 1 and 2: Pressures include erosion, rhododendron and laurel growth with bramble incursion. Evidence of deer grazing. In Habitat parcel 4 there were no threats or pressures apparent. Suggested management would be a coppice rotation and gradual introduction of natives such as oak, hornbeam and hazel.
Ellenberg values:	Transect 1 (Habitat parcel 1) min 2, max 8, mean 5.47. Transect 2 (Habitat parcel 2) min 2, max 8, mean 5.27. Transect 3 (Habitat parcels 3, 4 and 5) min 2, max 7, mean 5.34. Transect 4 (Habitat parcel 6) min 4, max 8, mean 5.75. Transect 5 (Habitat parcel 7) min 3, max 8, mean 5.23. Transect 6 (Habitat parcel 8): min 3, max 9, mean 5.79.
Ellenberg value score 4 and below:	Transect 1 (Habitat parcel 1): species with EV4: wood anemone, silver birch, wild strawberry, pedunculate oak and common dog violet species with EV 3: bracken; species with EV 2: field wood rush. Transect 2 (Habitat parcel 2): species with EV 4: agrimony, silver birch, wild strawberry, soft rush, selfheal, pedunculate oak, bulbous buttercup, common dog violet (not an AWI in Kent). Species with EV3: common spotted orchid, creeping soft grass, bracken and wood sage. Species with EV 2 common bird's-foot trefoil, southern wood rush. Transect 3 (Habitat parcels 3, 4 and 5): Species with EV4: Wood anemone, silver birch, wild strawberry, pedunculate oak, common dog violet. Species with EV3: wood sage. Species with EV2: field wood rush. Transect 4 (Habitat parcel 6): Species with EV4: wood anemone, silver birch, early purple-orchid, pedunculate oak, and common dog violet. No species with EV 3 or EV 2 Transect 5 (Habitat parcel 7): Species with EV 4 are silver birch, tufted hair grass, soft rush and pedunculate oak. Species with EV3 are creeping soft grass, bracken, and wood sage. Transect 6 (Habitat parcel 8) Species with EV 4 are silver birch, ivy and sessile oak, species with EV 3 is bracken.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Habitat parcel 2: score 27 (moderate); Habitat parcel 3, 4 and 5 assessed together: Score 29 (moderate); Habitat parcel 6, score 29, Habitat parcel 7: moderate (score 30); Habitat parcel 8: good (score 35).
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA.

	However, as the habitat within the additional areas was similar to that surveyed, that data is considered robust.
Habitat sensitivity - Area affected by Ndep:	For the purposes on the 2022 survey, and this site sensitivity description, the SSSI was divided into six transects and eight Habitat parcels, as follows: Transect 1 includes Habitat parcel 1; Transect 2 includes Habitat parcel 2; Transect 3 includes Habitat parcels 3, 4 and 5; Transect 5 includes Habitat parcel 7 and Transect 6 includes Habitat parcel 8 (see figure for transect locations). Survey of the eight Habitat parcels recorded species with every EV between 2 and 8 inclusive. Overall, 20 nitrogen sensitive species of EV4 or less were recorded, including 13 species with EV4, four species with EV4 and three species with EV2. Two AWIs of EV4 were recorded: wood anemone (in transects 1, 3 and 4) and primrose (in transect 2). One AWI of EV 2 was recorded, Southern wood-rush, (in transects 1, 2 and 3). Common dog violet, EV4, a nitrophobe and sensitive to nitrogen, and not an AWI in Kent, was present in the field layer in transects 3 and 4. Wild strawberry, EV4, was recorded in transects 1, 2 and 3), not an AWI in Kent. Early purple orchid EV4 was recorded in transect 4. Across the six transects, the following nitrophiles were frequent in the field layer: bluebell EV 6, was frequent in three transects. Bluebell may respond to increased nitrogen in the soil. Bramble, EV 6 was frequent to abundant in all transects and is known to respond to increased nitrogen. Ivy was locally abundant in transects 1 and frequent in transect 4 but not frequent in any of the other Habitat parcels. Dog's mercury, a nitrophile EV7, was frequent in transect 4, and locally abundant in transect 5. Cleavers, EV 8 an indicator of nutrient enrichment, was frequent in transect 4, and locally abundant in transect 5. Rough meadow grass, a nitrophile, EV 6, was frequent in transect 6, but not frequent in any of the other transects. This species is known to respond to increased nitrogen. Bracken, EV 3, a nitrophobe, was frequent in transect 6, but not frequent in not in any of the other transects. Of the six transects of this site, transect 2 had the lowest mean EV value of 5.27 and transect 6 had the highest mean EV value if 5.79. Transect 2 also had the highest number of nitrogen sensitive species, 14 species found in any of the transects, and Transect 6 had the lowest number of nitrogen sensitive species, with three sensitive species.

Assessment

Table 6.173 Shorne and Ashenbank Woods SSSI: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 51.9 DM: 49.56 DS: 50.19
Construction – impact extent (ha)	0.53
Construction - years where impact exceeds 0.4 kg N/ha/yr	2026
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 51.96 DM: 47.9 DS: 49.55
Operation - Ndep increase (max for site) kg N/ha/yr	1.65
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	16.49
Operation - increase over 0.4 kg N/ha/yr	1.25
Operation - impact extent (ha)	53.9
Operation - impact extent (% of site)	27.3
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)

Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.89.1 Shorne and Ashenbank Woods SSSI is a large site of almost 200ha, designated for woodland habitats on both sides of the A2. It overlaps with a number of ancient woodland blocks, which have also been assessed. The maximum increase in N deposition (DS-DM) is 1.65kg N/ha/yr, which is 16.5% of the LCL for broadleaved deciduous woodland. There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but this makes no difference to the outcome of the assessment of effects of increased N deposition.

Most of the NAA is either side of the A2, with a further very small area in the north-western corner which overlaps with AW_Theme_ID1486951 AW. The NAA adjacent and to the north of the A2 overlaps with AW_Theme_ID_1486860 (Shorne Woods) AW and Shorne/Brewers Wood AW. The NAA south of the A2 is in Ashenbank Wood.

Twenty nitrogen sensitive species of EV4 or less were recorded, including the AWIs; wood anemone, primrose and southern wood-rush. These species are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. There is other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as cleavers could also increase in cover as a result of increased N deposition.

The total area predicted to be affected by N deposition greater than the 0.4kg N/ha/yr screening threshold is 53.9ha, which is 27.3% of the designation.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in the affected parts of the site could change. As a result, there could be an effect on site integrity. However, it is of note that the site is showing signs of other external pressures such as recreation, littering and disturbance that could be exerting more influence on vegetation composition and site condition than N deposition from the adjacent roads.

Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of national value could be either large or very large. Given the precautionary measures adopted throughout the assessment, the resulting effect is assessed as large adverse (significant).

6.90 Shorne_Brewers Woods AW

Baseline

Table 6.174 Shorne_Brewers Woods AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	234_AW, 666_VT
Resource importance:	National
Overlapping site:	Shorne And Ashenbank Woods SSSI
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	65.91
Site Description - desk study:	Shorne/Brewers Wood AW lies entirely within Shorne and Ashenbank Woods SSSI. There is no separate description for the AW, but the SSSI citation of which the AW is part, describes that the woodland as a complex of ancient and plantation woodland and includes a variety of stand-types associated with Tertiary gravels, clays and sands. The site supports an important and diverse invertebrate fauna, especially beetles, true bugs and dragonflies. The woodland varies from pure sweet chestnut coppice, in places heavily invaded by sycamore, to a more mixed broadleaved community, consisting of mature oak, sweet chestnut, and hornbeam. The notified habitats of the site comprise the NVC woodland types W8 and W10.
Site Condition - As described in citation/by site manager:	Most of Shorne/Brewers AW lies within SSSI Unit 1, assessed by NE in Oct 2010 as being in favourable condition, with the following comments: 'This is a relatively small part of the SSSI and although parts of the woodland have poor structural diversity, the composition of the canopy is characteristic of the woodland type, a fairly rich ground flora is present and there are features present which are likely to make the area of value for invertebrates. The condition of the habitat is good. The extent of woodland is being maintained. The woodland is largely made up by even-aged sweet chestnut coppice re-growth with frequent old standards of oak and sweet chestnut. Only a relatively small proportion is made up by open space or early growth stage woodland but there is good ride-edge structure of potential value for invertebrates. Overall structural diversity is appropriate for the woodland type

	although the eastern end of the wood might benefit from re-coppicing to break up the canopy. There is good representation of standing and lying dead wood and parts have a shrub layer provided by holly, birch and hawthorn. The ground flora is characteristic with many species typical of acid soils including wood sage, bracken, heath speedwell and woodbine. Wood spurge is frequent in places. There are some patches of *Rhododendron ponticum*, particularly towards the eastern end but overall cover is within target levels. There is evidence of control measures in places. There are no indications of deer browsing and no evidence of constraints on tree regeneration'.
Dates surveyed (2021 and 2022):	21/05/22, 27-28/10/21 and 28/06/22
Field survey habitat parcel descriptions:	Shorne/Brewers Wood AW lies entirely within Shorne and Ashenbank Wood SSSI. In the 2022 survey, this AW includes Habitat parcels 3, 4, 5, 6 and 7 (i.e. not Habitat parcel 1, which is part of AW ThemeID 1486860, and not Habitat parcels 8, which are included under Shorne and Ashenbank Wood SSSI). Habitat parcel 2 is predominantly within the SSSI, with only a small section in the northeast corner also being covered by the AW designation. Therefore for the purposes of the 2022 survey, Habitat parcel 2 has not been included within Shorne_Brewers Woods AW for assessment. Habitat parcels 3 and 4: This transect is accessed via a steep path up onto a raised area and is bi-selected by a road. Two quadrats completed. The habitat is dominated by sweet chestnut coppice with some oak, hornbeam and sycamore, with occasional understorey of hazel and holly. The field layer is predominantly bluebell and bramble with some ferns. Several other AWIs are present but not in large numbers. The area is not very frequented by walkers and has few and narrow paths. There are no observed invasive plants, and there is no evidence of grazing or erosion. There were two quadrats done in this transect, one in each sector, as the transect is bisected by a road. The quadrats reflect that these areas are very much dominated by sweet chestnut and whilst there are areas of ground flora biodiversity they are not the norm. Habitat parcel 5: predominantly sweet chestnut coppice Habitat parcel 6: This is a triangle of land, isolated on all sides by slip roads and a main road, and access is only possible by crossing one of these roads. The area is partially fenced, with native planting on the slopes outside of the fenced area contiguous with the road. These slopes have a quite rich flora. The area surveyed was the entirety of the fenced area. It is a fragment of the surrounding woodland, being dominated by sweet chestnut with some native species both as standards and understorey. There is a significant AW ground flora including wood anemone, and early purple orchid. There are unsurprisingly no paths and there is no evidence of animal activity.

	Significant threats are the very large amount of rubbish present, including large parts of cars, metal drums and an assortment of other rubbish. Habitat parcel 7 Old sweet chestnut coppice with some other canopy trees of oak and silver birch. relatively diverse understory and diverse ground flora.
Lichens:	No lichens on available trees in any of the five Habitat parcels surveyed for this AW.
Vegetation gradient:	No vegetation gradient observed in any of the five Habitat parcels.
Notes on active management (field survey observations):	Habitat parcel 3: Hedge protection, likely to be against rabbits. Habitat parcel 4: There is little apparent management, although fallen trees are cut up when blocking the path, and some trees are earmarked for felling. A worker described how there is an active coppicing regime within Shorne Woods to provide biomass for the heating system at the information centre and for external sale as well. There was no evidence of recent coppicing in T3. There were no threats or pressures apparent. Suggested management would be a coppice rotation and gradual introduction of natives such as oak, hornbeam and hazel. Habitat parcel 6: Due to its isolation by being enclosed by busy roads it is unlikely that this land parcel is ever visited. There was clearly planting of hawthorn and dogwood etc in the past when the road was built and the land separated from the main parcel of Shorne woods. What remains is predominantly sweet chestnut coppice circa 30 years old from older standards. The ground flora is intact with little signs of nutrient enrichment and some Awe's present including a healthy population of orchis macula. Habitat parcel 7. No active management but remnant of old sweet chestnut and birch coppice.
Notes on required or beneficial management (field survey observations):	Habitat parcel 4: Suggested management is coppice rotation and introduction of native woodland trees and shrubs such as oak, hornbeam and hazel. Habitat parcel 6: A significant threat is the build up of rubbish from road users, such as car parts, and general plastic litter. Clearing this would be beneficial. Re-instatement of coppicing of the sweet chestnut and replacing with hazel and oak would be beneficial Shorne Wood Country Park Management Plan 2015-2020, includes a compartment summary providing compartment number, area, tree species and a long term management. However, there is no accompanying map showing the location of the compartments. Note also that the management plan is nearly 2 years out of date. It is unknown whether there is a current management plan.

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The AW is well used by members of the public and school groups, so will have associated pressures, including disturbance to wildlife and habitats, littering and dogs. Habitat parcel 3 and 4: no specific pressures of threats noted. Habitat parcel 5: invasive laurel noted. Habitat parcel 6: Significant threats are the very large amount of rubbish present, including large parts of cars, metal drums and an assortment of other rubbish. Habitat parcel 7 and 8. No specific threats noted.
Ellenberg values:	Transect 3 (Habitat parcels 3, 4 and 5) min 2, max 7, mean 5.34. Transect 4 (Habitat parcel 6) min 4, max 8, mean 5.75. Transect 5 (Habitat parcel 7) min 3, max 8, mean 5.23.
Ellenberg value score 4 and below:	Transect 3 (Habitat parcels 3, 4 and 5): Species with EV4: Wood anemone, silver birch, wild strawberry, pedunculate oak, common dog violet. Species with EV3: wood sage. Species with EV2: field wood rush.
Habitat type (UKHab category):	w1f: lowland mixed deciduous woodland;
Habitat condition - area affected by Ndep:	Habitat parcel 3, 4 and 5 assessed together: Score 29 (moderate); Habitat parcel 6, score 29 Habitat parcel 7 moderate (score 30)
Limitation(s):	Some of the NAA was not surveyed as survey was before the June 2022 air quality modelling update which resulted in a larger NAA However, as the habitat within the additional areas was similar to that surveyed, that data is considered robust.
Habitat sensitivity - Area affected by Ndep:	Survey of Shorne/Brewers AW (T3, T4, and T5) recorded species with every EV between 2 and 8 inclusive. Considering the three habitat parcels together, AWI species with potential sensitivity to nitrogen were wood anemone EV4, southern wood rush EV2 and early purple orchid EV4 . Wood anemone is listed as a nitrophobe by Pitcairn et al (2006). Bramble, EV6, a nitrophile known to respond to increased nitrogen, was frequent to abundant in all three habitat parcels. Bluebell, EV 6 was frequent in transect 3 and not recorded in transects 4 or 5. Bluebell may respond to nitrogen in wet soils (Pitcairn et al (2006). Cleavers, EV8, an indicator of nitrogen enrichment was not present in habitat parcel 3, frequent in habitat parcel 4 and locally abundant in habitat parcel 5. Rough meadow-grass, EV 6, a nitrophile known to respond to increased nitrogen, was frequent in habitat parcel 5 and not present in habitat parcels 3 or 4. Dog's mercury, EV 7, a nitrophile, was frequent in habitat parcel 4, occasional in habitat parcel 3 and not recorded in habitat parcel 5. The nitrophobe common dog violet was rare in habitat parcel 3, occasional in habitat parcel 4 and not positively

	identified in habitat parcel 5 (*Viola* sp was identified). Ivy, a nitrophile EV7, was frequent in the field layer of habitat parcel 4, but not recorded in habitat parcel 3 or 5. Habitat parcel 5 had the lowest mean EV of 5.23 and habitat parcel 4 had the highest mean at EV 5.75. Habitat parcels 3 and 5 both recorded seven potentially sensitive species (EV4 or less) and habitat parcel 4 recorded five potentially sensitive species.

Assessment

Table 6.175 Shorne_Brewers Woods AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 44.92 DM: 40.22 DS: 40
Construction – impact extent (ha)	0.31
Construction - years where impact exceeds 0.4 kg N/ha/yr	2026, 2026
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 32.2 DM: 31.21 DS: 31.66
Operation - Ndep increase (max for site) kg N/ha/yr	0.44
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.43
Operation - increase over 0.4 kg N/ha/yr	0.04
Operation - impact extent (ha)	11.24

Operation - impact extent (% of site)	17.05
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.90.1 Shorne /Brewers Wood is entirely within Shorne and Ashenbank Woods SSSI, on the north side of the A2. There is a small amount of vegetation removal as part of the Project, all of which is in the NAA, but this makes no difference to the outcome of the assessment of effects of increased N deposition.

AWI species with possible sensitivity to nitrogen were wood anemone (EV4), southern wood rush (EV2) and early purple orchid (EV4). These species are persisting in current and historic high levels of N deposition, but further increases could put these species at risk of loss. There are other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as cleavers could also increase in cover as a result of increased N deposition.

The total area predicted to be affected by N deposition greater than the 0.4kg N/ha/yr screening threshold is 11.24ha, which is 17.1% of the designation.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in the affected parts of the site could change. As a result, there could be an effect on site integrity. However, it is of note that the site is showing signs of other external pressures such as recreation, littering and disturbance that could be exerting more influence on vegetation composition and site condition than N deposition from the adjacent roads.

Therefore, the impact level has been assessed as major adverse. The effect of a major impact level on a site of national value could be either large or very large. Given the precautionary measures adopted throughout the assessment, the resulting effect is assessed as large adverse (significant).

6.91 St Michael and All Angels Church LWS

Baseline

Table 6.176 St Michael and All Angels Church LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	620_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	0.39
Site Description - desk study:	Scattered trees and a small wooded area to the south east of the churchyard and no scrub visible. Potentially a grassland habitat for the remaining area. Adjacent to the courtyard to the north there is a deciduous woodland with conifers to the south and south east of the woodland,
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.177 St Michael and All Angels Church LWS: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 38 DM: 32.86 DS: 34.8

Operation - Ndep increase (max for site) kg N/ha/yr	1.95
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	9.74
Operation - increase over 0.4 kg N/ha/yr	1.55
Operation - impact extent (ha)	0.39
Operation - impact extent (% of site)	100.0
Operation - impact duration (years until emissions DS = DM at opening yr)	11
Mitigation proposed	Not required
Impact level	Moderate adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.91.1 No survey was undertaken in 2022 as access was not granted. The DM and DS N deposition both exceed the critical load range for neutral grassland of 20-30kg N /ha/yr. The increase in N deposition (DS-DM) is 1.95kg N/ha/yr and 9.7% of the LCL. The LWS is a small churchyard and all 0.39ha of the designation is affected. Aerial imagery suggests that the site supports grassland and a small wooded area. It is unknown whether any nitrogen-sensitive species are present. Given the absence of survey information and because the whole site is affected by a relatively high magnitude of increase in N deposition, it is possible that there will be an effect on the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 11 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse, resulting in a slight adverse effect (not significant).

6.92 Strawberry Farm Wood SINC

Baseline

Table 6.178 Strawberry Farm Wood SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	523_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.67
Site Description - desk study:	Strawberry Hill Farm is a Borough Grade 2 SINC in the London Borough of Havering (NGR TQ 568 889, post code RM14 1TY). The GiGL description states: 'This is a small wood, probably ancient (not shown as AW but as deciduous woodland priority habitat on MAGIC 2022) dominated by pedunculate oak, with some ash, silver birch and occasional wild service-tree. In addition, there are several large beech and false acacia along the A127. Large elms and coppiced hazel grow from a bank forming the western boundary of the wood. The shrub layer is predominantly hawthorn and the ground flora includes ivy, male fern, and cow parsley, with the locally uncommon bearded couch frequent towards the west of the site. '
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	12/07/2022
Field survey habitat parcel descriptions:	Mainly W10 (oak-bracken-bramble) woodland with a canopy of abundant oak and frequent ash, the latter species to the east. The understorey has frequent blackthorn, ash, hawthorn and elder. The field layer has frequent to locally abundant bramble and ivy with occasional bluebell. Five AWI species recorded: bluebell, black bryony, redcurrant, yellow archangel and spindle.

Lichens:	No lichens on suitable trees
Vegetation gradient:	No observable vegetation gradient. Nettles frequent throughout.
Notes on active management (field survey observations):	Little evidence of management but grazed by horses accessing from the adjoining field, which does not appear to be having a negative impact on the vegetation. No significant public access.
Notes on required or beneficial management (field survey observations):	The woodland is considered to be in good condition, so maintain current management including continuation of horse grazing at current stocking density and retaining dead wood.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	None observed
Ellenberg values:	min 3, max 8, mean 5.95.
Ellenberg value score 4 and below:	EV 4: self-heal, pedunculate oak and common ragwort. EV3: tor grass and bracken.
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Condition: good (score 33)
Limitation(s):	The woodland was very dry with considerable wilting so species may have been under-recorded.
Habitat sensitivity - Area affected by Ndep:	Survey of Strawberry Farm Wood SINC recorded species with every EV between 3 and 8 inclusive. Primrose (EV 4), the only AWI that is a nitrophobe was infrequent. Five other rare and occasionally recorded AWI species were present, and these had EV values of 5 and 6. A total of 11 nitrophiles were present in the field layer, the most common of which were ivy EV6, bramble EV6 and common chickweed which were frequent or locally abundant. Bramble is known to respond to increased nitrogen Pitcairn et al (2006). No vegetation gradient was observed. Species indicative of nutrient enrichment include common nettle and cleavers, both EV8, were occasional in the field layer and hedge woundwort EV 8 was rare in the quadrat.

Assessment

Table 6.179 Strawberry Farm Wood SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 46.77 DM: 45.37 DS: 47.93
Operation - Ndep increase (max for site) kg N/ha/yr	2.56
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	25.57
Operation - increase over 0.4 kg N/ha/yr	2.16
Operation - impact extent (ha)	1.67
Operation - impact extent (% of site)	100.0
Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.92.1 The increase in N deposition (DS-DM) is 2.56kg N/ha/yr. The site supports broadleaved deciduous woodland which has a LCL of 10kg N/ha/yr. The increase in N deposition is 25.6% of this LCL. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. There was one nitrophobic AWI, primrose (EV4), the other five rare and occasionally recorded AWI species had EV values of 5 and 6. Eleven nitrophiles were identified, including bramble (EV6), which is known to respond to increased nitrogen. Increased N deposition is likely to cause an increase in the abundance and spread of nitrophilic plant species such as bramble, ivy and nettle which could out-compete primrose, which is considered to be at risk of loss as a result. The whole site is predicted to affected, which could lead to an impact on the integrity of the site. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse, which results in an effect of slight adverse (not significant).

6.93 Terrels Heath Grays LWS

Baseline

Table 6.180 Terrels Heath Grays LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	383_LWS
Resource importance:	County
Overlapping site:	CHADWELL WOOD (AW_Theme_ID 1119923) AW,
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	2.51
Site Description - desk study:	Terrels Heath Grays LWS is adjacent to the A1089 and overlaps with Chadwell Wood AW. The AW boundary is slightly closer to the road, but the LWS extends further to the north.

	The citation describes the site as having a high forest structure dominated by Pedunculate Oak (*Quercus robur*).
Site Condition - As described in citation/by site manager:	Under Condition and Proposed management, Terrels Heath LWS description, states the following: 'Ancient woods on acid sandy soils are invariably poorer in ancient woodland ground flora than those on damp, neutral soils. However, the flora here is particularly poor, possibly due to decades of heavy recreational pressure and the previous management to the south that has left a very sparse, open canopy. Control of the number of footpaths is desirable but is likely to prove difficult. Some re-stocking with appropriate native trees and shrubs would improve the wildlife value of this Site.'
Dates surveyed (2021 and 2022):	17/08/2022
Field survey habitat parcel descriptions:	Habitat parcel 1. Oak woodland with well-spaced abundant oak trees around 30 to 40 cm diameter which looks natural not planted. Occasional wild cherry in the canopy. The understorey has frequent field maple with occasional hawthorn and rare spindle. The field layer is dominated by bramble with frequent ivy, bluebell and garlic mustard. Habitat parcel 2: A mown grassland within open woodland dominated by false oat grass and cocksfoot with abundant common bent and occasional forbs. The grassland was surveyed under drought conditions, so species are likely to have been missed. It is probably cut annually as little sign of woody species or bramble moving in. A path cuts through the site. Some scattered rubbish was observed.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	Habitat parcel 1: no active management observed; Habitat parcel 2: grassland appears to be mown annually.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Reduce bramble cover and plant native trees and shrubs to diversity woodland. Habitat parcel 2: A more varied grass cutting regime would benefit the grassland including cutting at different vegetation heights, more frequent cuts, (at least two, one in early spring and another in late autumn after forb have seeded) to reduce the abundance false oat grass and cocksfoot Keep some grassland uncut for two years to benefit invertebrates that overwinter in stems. Remove the cuttings to reduce grassland's nutrient status.

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1: bramble is outcompeting other native woodland flora. The LWS description states recreational pressure has resulted in in considerable disturbance to woodland flora. Habitat parcel 2: recreational pressure.
Ellenberg values:	Habitat parcel 1: min 4, max 8, mean 6.4. Habitat parcel 2: min 3, max 8, mean 5.
Ellenberg value score 4 and below:	Habitat parcel 1: EV4 pedunculate oak; Habitat parcel 2: 10 species with EV4: yarrow, common bent, soft brome, crested dogs tail, broom, smaller cat's tail, ribwort plantain, pedunculate oak, common sorrel and ragwort; EV3: sweet vernal grass.
Habitat type (UKHab category):	Habitat parcel 1: w1f - Lowland mixed deciduous woodland; Habitat parcel 2: g3c5 - Arrhenatherum neutral grassland.
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland): moderate (score 32); Habitat parcel 2 (grassland): moderate
Limitation(s):	Surveyed in drought conditions
Habitat sensitivity - Area affected by Ndep:	Survey of Habitat parcel 1 (woodland) recorded species with every EV between 4 and 8 inclusive. No AWI species with EV below 4 were recorded, although the AWI, bluebell, EV6, a nitrophile was frequent in the field layer. Bluebell may respond to increased nitrogen in moist soils (Pitcairn et al.,2006). Other nitrophiles occurring frequently or more were ivy, EV6 and bramble EV6. Bramble is known to respond to increased nitrogen. No nitrophobes were recorded in Habitat parcel 1. Species indicative of nutrient enrichment, EV8, were garlic mustard, EV8 (frequent), cleavers (occasional) and common nettle, occasional. Survey of Habitat parcel 2 (grassland) recorded species with every EV between 3 and 8 inclusive. No AWI species with EV below 4 were recorded, although the AWI, bluebell, EV6, a nitrophile was rare in the grassland. Bluebell may respond to increased nitrogen in moist soils (Pitcairn et al., 2006). The only frequently occurring nitrophile was cock's-foot, EV6, which may respond to increased nitrogen (Pitcairn et al.,2006). Sweet vernal-grass, a nitrophobe, EV3, was frequent in the grassland. No vegetation gradient was observed. The only species indicative of nutrient enrichment was garlic mustard, EV8, which was occurred rarely in the grassland.

Assessment

Table 6.181 Terrels Heath Grays LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 32.63 DM: 32.63 DS: 33.04
Operation - Ndep increase (max for site) kg N/ha/yr	0.41
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.12
Operation - increase over 0.4 kg N/ha/yr	0.01
Operation - impact extent (ha)	0.08
Operation - impact extent (% of site)	3.36
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.93.1 The increase in N deposition (DS-DM) is 0.41kg N/ha/yr. Within the NAA the site supports mixed deciduous woodland and neutral grassland (a larger area of mixed deciduous woodland is captured within Chadwell Wood AW). A precautionary LCL for broadleaved deciduous woodland of 10kg N/ha/yr has been used and the increase in N deposition is 4.1% of this LCL. It is estimated that 3.4% of this 2.51ha site is affected by increased N deposition.
The site investigation did not find any observable vegetation gradient and no lichens on suitable trees were identified. Within the woodland in the NAA no AWI with an EV below 4 or nitrophobic species were recorded. Frequently recorded nitrophiles included bluebell (EV6, may respond to increased nitrogen in moist soils Pitcairn et al (2006)) and bramble (EV6) and known to respond to increased nitrogen (Pitcairn et al., 2006). It was noted that there is a lack of management within the woodland and that bramble is out-competing ground flora.
Within the grassland in the NAA, 10 species with an EV4 and one with EV3, sweet vernal grass, a nitrophobe (Pitcairn et al., 2006), were recorded: The grassland is dominated by false oat-grass and cock's-foot (EV6), both of which are typical of mesotrophic grasslands and may respond to increased nitrogen (Pitcairn et al., 2006).
Recreational pressure was observed within both the grassland and woodland and this is referred to within Terrels Heath Grays LWS description as having considerable disturbance to woodland flora.
Additional N deposition may lead to an increase in the growth and range of nitrophilic species, including bluebell and bramble, and has the potential to reduce the floristic diversity and lead to the loss of some nitrogen sensitive species. However, the current lack of management is having a similar effect on structure and diversity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and reversible.
Given the absence of sensitive species, the relatively small magnitude in increase in N deposition and only 3.4% of the site is affected by increased N deposition it is unlikely that there will be an adverse effect on the site's integrity.
Therefore, the impact level has been assessed as negligible adverse, resulting in a slight adverse effect (not significant).

6.94 Thames Chase Forest Centre SINC

Baseline

Table 6.182 Thames Chase Forest Centre SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	519_LWS, 520_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	Yes
Side of River Thames:	North
Site area (ha):	40.09
Site Description - desk study:	GiGL's description of Thames Chase Forest Centre SINC is as follows (post code RM14 3NS, NGR TQ 5833 8588). The site is a former working farm located at the heart of the Thames Chase Community Forest. It includes a visitor centre made up of historic farm buildings with interpretive exhibitions, an education room, outdoor classroom, dedicated on-site staff as well as a shop and cafe, and it also provides educational visits for schools. The site also includes the Thames Chase Community Forest plantation area, which is in part used as demonstration woodland. Good quality footpaths cross the site, giving access to all parts. The Havering Walking the Way to Health (WHI) project uses this site. The habitats within the park include woodland, ancient and recently planted hedges, streams and ponds. Most of the planted trees at the Centre are native broadleaves, with a little Scots pine and larch. In some parts of the site the trees are still small and grow among grassland, tall herbs and bramble scrub. Some of the ancient hedges have old hollow pollards and one contains a wild service-tree. Elsewhere, more recently planted hedges include frequent corn parsley in the adjacent grassland. Other boundaries are formed by streams with treelines of oak and various willows, areas dominated by great reedmace and reed canary-grass, and with quite diverse wet tall herb. Water voles are present here. There are two man-made ponds, one of which features an island with mature oak and crack willow trees. The other pond has well-

	developed aquatic vegetation including the uncommon lesser reedmace, as well as a pond-dipping platform. A water crowfoot is also well established.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	4 and 5 May 2022
Field survey habitat parcel descriptions:	Habitat parcel 1 (woodland): immature, densely planted, mainly broadleaved woodland. One area with hazel coppice, but otherwise minimal signs of management since planting about 20 years ago. Habitat parcel 2 (woodland): Predominantly broadleaved plantation woodland, perhaps 20 years old. Densely planted making access difficult. Ground layer is grassy and has not yet developed a true woodland character. Habitat parcel 3 (grassland): species-poor, rank neutral grassland but some areas are regularly mown, in particular just to the south of the visitor centre.
Lichens:	Habitat parcel 1 (lichen group 1): trunks LIS 2 (very poor); branches LIS 1.5 (very poor). Habitat parcel 1 (lichen group 2): trunks LIS 2 (very polluted); Branches, not enough data to use tool, but only nitrogen tolerant lichens present.
Vegetation gradient:	Habitat parcel 1 (woodland): not observable gradient: immature plantation woodland throughout, densely shaded with a sparse ground flora, which has not yet established a semi- natural character. Habitat parcel 2 (woodland): immature, dense, species poor plantation woodland with no visible vegetation gradient. Habitat parcel 3 (grassland): no observable gradient.
Notes on active management (field survey observations):	Habitat parcel 1 (woodland): one area with hazel coppice, but otherwise minimal signs of management since planting estimated about 20 years ago. Young lime plantation at south of transect. Young alder woodland to the west of the transect probably developing naturally on poorly drained soils with a ground layer dominated by nettle, typical of semi natural wet woodland. Habitat parcel 2 (woodland): recently planted woodland and scrub, often impenetrable. Habitat parcel 3 (grassland): unmanaged, species poor with scrub encroachment and nettles dominant in places. Some areas are amenity and regularly mown, in particular just to the south of the visitor centre. There was an unmanaged orchard with intermittent mowing.

Notes on required or beneficial management (field survey observations):	Habitat parcel 1 (woodland): substantial thinning and planting of native trees and shrubs. Habitat parcel 2 (woodland): Preferably natural regeneration, otherwise supplementary planting. Removal of tree guards. Habitat parcel 3 (grassland): less frequent mowing i.e., late summer cut, with removal of cuttings.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcel 1 (woodland): one Japanese rose noted, and ash dieback present in less than 10% of the canopy. Habitat parcel 2 (woodland): Woodland too dense to be of conservation value.
Ellenberg values:	Habitat parcel 1 (woodland): min 2, max 8, mean 5.52. Habitat parcel 2 (woodland): min 2, max 8, mean 5.62. Habitat parcel 3 (grassland): min 3, max 9, mean 5.94.
Ellenberg value score 4 and below:	Habitat parcel 1 (woodland): Nine species of EV4: common bent; silver birch, heath bedstraw, common ragwort, flattened meadow grass, primrose, common fleabane, pedunculate oak and rowan. one species of EV2, Scots Pine. Habitat parcel 2 (woodland): Seven species of EV4: agrimony, silver birch, common ragwort, common fleabane, holly oak, pedunculate oak and meadow buttercup. Habitat parcel 3 (grassland): Ten species of EV 4: agrimony, common mouse ear, heath bedstraw, common ragwort, ribwort plantain, flattened meadow grass, selfheal, fleabane, meadow buttercup and common vetch; Three species of EV3: sweet vernal grass and hoary plantain.
Habitat type (UKHab category):	Habitat parcel 1: w1g - other woodland, broadleaved Habitat parcel 2: w1g - Other woodland; broadleaved Habitat parcel 3: g3 - other neutral grassland
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland) moderate (score 26); Habitat parcel 2 (woodland) moderate (26 points); Habitat parcel 3 (grassland), poor condition.
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	The two woodland Habitat parcels, Habitat parcel 1 and Habitat parcel 2 are considered together, as follows: Survey of Habitat parcel 1 and Habitat parcel recorded species with every EV between 2 and 8 inclusive. No AWIs were recorded in Habitat parcel 1 and one AWI was recorded in Habitat parcel 2, greater burnet saxifrage (EV6). No nitrophobes were present in the field layer of Habitat parcels 1 or 2. The nitrophile bramble EV6, was frequent in both Habitat parcels 1 and 2; this species is known to respond to increased nitrogen (Pitcairn et al., 2006). Nettle, EV 8, an indicator of nutrient enrichment was locally abundant

	in Habitat parcel 1, but not recorded in Habitat parcel 2. In Habitat parcel 2, the nitrophile Yorkshire fog EV 5 was frequent; this species has the potential to increase with nitrogen (Pitcairn et al., 2006). Habitat parcel 1 had two indicators on nutrient enrichment, EV8, in the field layer: cleavers and common nettle. Habitat parcel 2 had two indicators of enrichment: wild carrot and cleavers. The mean EV of Habitat parcel 1, of 5.52, was lower than the mean EV or Habitat parcel 2, of 5.62, and had ten species of EV4 or lower, compared to nine species of EV4 or lower in Habitat parcel 2. Survey of Habitat parcel 3 (grassland) recorded species with every EV between 3 and 9 inclusive. No AWI were recorded. No nitrophobes were present in the field layer. The nitrophile Yorkshire fog EV 5 was abundant; this species has the potential to increase with nitrogen (Pitcairn et al., 2006). Nitrophiles included frequently occurring bramble EV6 and this species is known to respond to increased nitrogen. Common nettle EV8, an indicator of nutrient enrichment, was locally abundant. The nitrophiles cock's foot EV6 and false oat grass EV7 were frequent. Habitat parcel 3 had six species of EV8, and one of EV9 greater burdock, suggesting nutrient enrichment.

Assessment

Table 6.183 Thames Chase Forest Centre SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Construction and Operation
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 32.97 DM: 32.13 DS: 34.23
Construction – impact extent (ha)	2.05
Construction - years where impact exceeds 0.4 kg N/ha/yr	2025, 2026, 2027, 2028

Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 36.28 DM: 35.68 DS: 37.75
Operation - Ndep increase (max for site) kg N/ha/yr	2.37
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	23.67
Operation - increase over 0.4 kg N/ha/yr	1.97
Operation - impact extent (ha)	21.23
Operation - impact extent (% of site)	52.96
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Major adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.94.1 This site is affected by increased N deposition during both construction and operation. The modelled impacts occur in different areas of the site and have therefore been assessed separately. The NAA during construction is in the west of the site and the operational NAA is in the eastern part of the site. This part of the site is also subject to vegetation removal and post-construction restoration. It was not possible to obtain site survey information for the construction NAA in 2022, so an assessment was made using desk study information and survey information from the operational NAA.
Construction:
The maximum increase in N deposition (DS-DM) is 2.38kg N/ha/yr. Aerial imagery indicates that the NAA is predominantly broadleaved woodland, with a LCL of 10kg N/ha/yr. It has been assumed that the species composition, including the possible presence of sensitive species is likely to be similar to those identified within the woodland NAA for operation. The NAA is 2.05 ha, which is 5% of the designated area, and the screening threshold of 0.4kg N/ha/yr is exceeded for four years of the construction phase. It is unlikely that increased N deposition during the construction phase

will affect site integrity, given the size of the NAA and the temporary duration of the impact. Therefore, the impact level during construction has been assessed as negligible adverse. The effect of a negligible impact level on a site of county or metropolitan value could be either neutral or slight. Given the absence of survey data for this part of the site, extra precaution is taken, and the effect is assessed as slight adverse (not significant).

Operation:

The increase in N deposition (DS-DM) is 2.37kg N/ha/yr. The NAA supports a mosaic of broadleaved woodland and neutral grassland. The lowest LCL of these habitats is 10kg N/ha/yr (broadleaved deciduous woodland) and the increase in N deposition is 23.7% of this LCL. There were no vegetation gradients identified during the survey. Two groups of trees within the broadleaved woodland area to the south of the NAA were subject to a lichen survey, the results indicated that the trees were already subject to pollution, with a further tree in the north-east of the NAA of woodland only supporting nitrogen tolerant lichens.

Within the two distinct areas of broadleaved woodland, one AWI was identified, greater burnet saxifrage (EV6). No nitrophobes were present in the field layer. Up to nine species of plants with an EV of 4 were identified within the woodland. There is frequently occurring bramble (EV6) within both woodland areas, as well as nettle (EV8) and Yorkshire fog (EV5) in some of the woodland areas. Increased N deposition could lead to the loss of some of the nitrogen sensitive species and an increase in the nitrophilic species such as bramble and nettle.

The neutral grassland did not support any nitrophobic species, but does support several nitrophilic species, including abundant Yorkshire fog (EV5) and bramble (EV6). Therefore, there is no risk of loss of sensitive species and no observable change to the species composition of the grassland is anticipated as nitrophilic species are already dominant.

Considering the total NAA accounts for 53% of the designated site, there could be an effect on site integrity. However, most of the NAA is subject to vegetation removal and subsequent restoration as part of the Project. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the operational impact level has been assessed as major adverse. The effect of a major impact level on a site of county or metropolitan value could be either slight or moderate. Given the precautionary approach adopted throughout this assessment, and that the site is to be restored post-construction, the effect is assessed as slight adverse (not significant).

6.95 The Oaks LWS

Baseline

Table 6.184 The Oaks LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	57_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	13.95
Site Description - desk study:	The name of this wood may be derived from the central section of the western half of this wood, which is dominated by Pedunculate Oak (*Quercus robur*). This section is bounded by earth banks and ditches, indicating an old, possibly ancient status for this section, although the remainder of the wood is recent in origin. The southern half of the wood comprises Ash (*Fraxinus excelsior*) and Oak, with some Ash and Hornbeam (*Carpinus betulus*) centrally. In the north-east corner is a small plantation of Poplars (*Populus sp.*) and Larch (*Larix sp.*). The ground flora is dominated by False Brome (*Brachypodium sylvaticum*), Male-fern (*Dryopteris filix-mas*), Dog's Mercury (*Mercurialis perennis*) and Common Nettle (*Urtica dioica*). A small number of ancient woodland indicator plants are associated with the area of old oakwood, namely Moschatel (*Adoxa moschatellina*), Bluebell (*Hyacinthoides non-scripta*) and Three-nerved Sandwort (*Moehringia trinervia*).
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A

Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.185 The Oaks LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 42.78 DM: 42.34 DS: 42.75
Operation - Ndep increase (max for site) kg N/ha/yr	0.41
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.1
Operation - increase over 0.4 kg N/ha/yr	0.01
Operation - impact extent (ha)	0.03
Operation - impact extent (% of site)	0.18
Operation - impact duration (years until emissions DS = DM at opening yr)	0
Mitigation proposed	Not required
Impact level	No change
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.95.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) only just exceeds the screening threshold at 0.41kg N/ha/yr, which is 4.1% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr.

The citation indicates that a small part of this LWS might be ancient woodland and there are a number of AWIs present, such moschatel, bluebell and three-nerved sandwort. There may be species sensitive to increased N deposition, but the NAA is so small at 0.03ha (0.2% of the site), that no effect on site integrity is predicted as a result of this relatively small increase in N deposition.

The time taken for DS NO_x emissions to reduce to DM levels is negligible (calculated as zero), so is assessed as

temporary and reversible. Therefore, the impact level has been assessed as no change, which results in a neutral effect (not significant).

6.96 The Osiers AW

Baseline

Table 6.186 The Osiers AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	81_AW
Resource importance:	National
Overlapping site:	Ingrebourne Valley SINC
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	4.18
Site Description - desk study:	The Osiers (post code CM14 5RA, NGR: TQ5532 9355) comprises a stand of woodland adjacent to the M25, north of junction 28. The site is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. The Osiers is part of Dagnam Park Nature Reserve (http://www.friendsofdagnampark.org.uk/Extension%20to%20NR.htm).
Site Condition - As described in citation/by site manager:	There is a management plan for Dagnam Park (which refers to all woodland as 'Compartment B regardless of where it is located). The Plan does not refer to The Osiers specifically, other than to say it is an ancient woodland, but it does mention that the 'woodland strips' create heavily shaded conditions on the woodland floor for much of the year and that 'excessive shade, grazing and trampling by deer are the main contributing factors to the poor development of the shrub layer, ground flora and poor tree regeneration in the woodland areas.
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A

Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.187 The Osiers AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.17 DM: 52.06 DS: 53.4
Operation - Ndep increase (max for site) kg N/ha/yr	1.34
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	13.37
Operation - increase over 0.4 kg N/ha/yr	0.94
Operation - impact extent (ha)	0.16
Operation - impact extent (% of site)	3.89
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.96.1 No survey was undertaken in 2022 as access was not granted. The increase in N deposition (DS-DM) is 1.34kg N/ha/yr, which is 13.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr.
It is not known whether any nitrogen sensitive species are present. The site is adjacent to the M25, just to the north of the northern extent of Ingrebourne Valley SINC.
Given that the site is already subject to N deposition from the M25, and that the area affected is only 3.9% of the AW, no impact on site integrity is anticipated as a result of an increase in N deposition. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.97 The Selvage LWS

Baseline

Table 6.188 The Selvage LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	507_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	6.69
Site Description - desk study:	The Selvage LWS description (2009) describes the site as a linear woodland with pedunculate oak dominant in the canopy, with frequent sycamore and some hornbeam (both coppiced and uncoppiced) and ash. There is little understorey aside from that formed by occasional hazel coppice stools and young sycamore. The ground flora is sparse and species-poor, with common nettle, bramble and grasses locally dominant. However, bluebell and dog's mercury are occasional to locally dominant. There is a large amount of fallen dead wood habitat. A small stream passes through the northern part of the site.
Site Condition - As described in citation/by site manager:	The LWS description (2009) notes that its previous wildlife corridor function has been severely interrupted by the construction of the M25, but some of the wildlife corridor function may still exist. It notes that the ground flora is sparse and species poor, with common nettle, bramble and grasses locally dominant. It also notes there is a lot of felled dead wood.
Dates surveyed (2021 and 2022):	27/07/22
Field survey habitat parcel descriptions:	Habitat parcel 1 (south of the M25): The NAA covers an open remnant of young ash woodland (50 cm DBH) with frequent oak and sycamore in the canopy. The understorey comprised frequent small leaved elm with occasional hazel and hawthorn. All ash showing signs of dieback. The small-leaved elm is bark stripped from browsing deer and includes standing dead wood. Deer were seen during the survey. Field layer was predominantly

	abundant wood false-brome, frequent wavy hair-grass, dog's-mercury and bare ground. No AWIs were observed. Adjacent is a more recent plantation woodland with some young ash. Habitat parcel 2 (north of the M25): The woodland had an open canopy and comprised a plantation of abundant ash with occasional oak, wild cherry, hornbeam, alder and hawthorn. The trees were young, ranging from DBH 10-30 cms. Ash dieback was observed. The area was fenced on all sides so surveyed from outside of the plot. The field layer had abundant wood false-brome and bramble and was species poor. No AWI were observed. Bracken was rare.
Lichens:	No lichens were observed on suitable trees.
Vegetation gradient:	No vegetation gradient was observed in either Habitat parcel.
Notes on active management (field survey observations):	Habitat parcel 1 (south of M25) No management was observed. Deer browsing is possibly preventing regeneration. Habitat parcel 2 (north of the M25): none.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1 (south of M25): Plant native shrubs and re-establish hazel coppice. Habitat parcel 2 (north of M25): The ash may need to be felled if it is a hazard, otherwise retain as standing dead wood. Plant native shrubs.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The LWS description states that the site's previous function as a wildlife corridor has been severely interrupted by the construction of the M25, but some function in this respect may still exist.
Ellenberg values:	Habitat parcel 1 (south of M25): min 4, max 8 and mean 6.12. Habitat parcel 2: min 3, max 8, mean 5.96.
Ellenberg value score 4 and below:	Habitat parcel 1 (south of M25): two species with EV4: tufted hair grass; pedunculate oak. Habitat parcel 2 (north of M25): three species with EV4: ribwort plantain; fleabane and pedunculate oak; one species with EV3, bracken.
Habitat type (UKHab category):	Habitat parcel 1 (south of the road): w1f - Lowland mixed deciduous woodland; Habitat parcel 2: (north of the road): w1f - Lowland mixed deciduous woodland.
Habitat condition - area affected by Ndep:	Habitat parcel 1 (south of the M25): moderate (score 27). Habitat parcel 2 (north of the M25): moderate (score 27).

Limitation(s):	Habitat parcel 1 (south of the M25): no limitation. Habitat parcel 2 (north of the M25): The area was fenced on all sides so it was surveyed from outside the plot.
Habitat sensitivity - Area affected by Ndep:	Survey of the two Habitat parcels recorded species with every EV between 2 and 8 inclusive. One nitrophobe, bracken, EV3 was recorded in Habitat parcel 2, where it was rare. No other nitrophobes were recorded in either of the two Habitat parcels. Overall, five nitrogen sensitive species of EV4 or less were recorded, including four species with EV4 and one species with EV3. One AWI was recorded in the field layer of Habitat parcel 2, field rose EV5 which is not sensitive to nitrogen. The nitrophile rough meadow-grass, EV6, was frequent in Habitat parcel 1 but not present in Habitat parcel 2. This species is known to respond to increased nitrogen. Six other nitrophiles were present in Habitat parcel 1, all of which occasional-rare in the vegetation. Habitat parcel 2 had 3 nitrophiles that were frequent or abundant: false oat-grass, EV7; Yorkshire fog, EV5, which has potential to increase with nitrogen; and bramble, EV6, known to respond to increased nitrogen. The nitrophile common nettle, EV8, an indicator of nutrient enrichment, was rare in both Habitat parcels. Of the two Habitat parcels of this site, Habitat parcel 2 had the lowest mean EV value of 5.96 and Habitat parcel 1 had the highest mean EV value of 6.12. Habitat parcel 2 also had the highest number of nitrogen sensitive species (four species) and Habitat parcel 1 had the lowest at two sensitive species.

Assessment

Table 6.189 The Selvage LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 55.32 DM: 53.56 DS: 54.04
Operation - Ndep increase (max for site) kg N/ha/yr	0.48
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.76
Operation - increase over 0.4 kg N/ha/yr	0.08
Operation - impact extent (ha)	0.08
Operation - impact extent (% of site)	1.17
Operation - impact duration (years until emissions DS = DM at opening yr)	4
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.97.1 The increase in N deposition (DS-DM) is 0.48N/ha/yr. The NAA supports broadleaved deciduous woodland (LCL is 10kg N/ha/yr) and is located to the south and north of the M25 within this LWS. The increase in N deposition is 4.8% of the LCL.

The site investigation did not observe a vegetation gradient or lichens on suitable trees within either NAA. Ash dieback was noted to be present in both NAA. The NAA to the north of the M25 was fenced off, appeared managed and did not show signs of pressure from deer grazing unlike the NAA to the south of the M25 where deer grazing pressure and lack of management was noted.

Bracken, a nitrophobe was rarely recorded in the NAA to the north of the M25, no other nitrophobic species were

recorded in either NAA. No AWIs sensitive to nitrogen were recorded.
Three frequently and abundantly recorded nitrophilic species were identified in the NAA to the north of the M25 and eight nitrophilic species (including the frequently recorded rough meadow grass, EV6) were identified in the NAA to the south of the M25.
Overall, five nitrogen sensitive species of EV4 or less were recorded, including four species with EV4 and one species with EV3.
The condition and integrity of this site is likely already being compromised by the presence of ash dieback, and lack of management and deer grazing pressure to the south of the M25. An increase in N deposition has the potential to increase the frequency and distribution of nitrophilic species and may lead to the loss of nitrogen sensitive species. However as only 1.2% of the site is predicted to be affected, additional N deposition is unlikely to affect the integrity of this LWS.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 4 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse.
The effect of a negligible adverse impact level on a site of county value could be either neutral or slight. Given the small area affected and the precautionary measures adopted throughout this assessment, this is considered to result in a neutral effect (not significant).

6.98 Titsey Woods SSSI

Baseline

Table 6.190 Titsey Woods SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	156_SSSI, 346_SSSI_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	45.35

Site Description - desk study:	Titsey Wood SSSI lies along both sides of the M25. Parts of the SSSI are designated as AW in the inventory of Ancient Woodland for England. The citation states that the SSSI is notified for its wet semi-natural woodland which as a diverse ground flora which supports uncommon moths and butterflies. Much of the woodland consists of mature pedunculate oak with ash, hazel and field maple. Wych elm, birch and hawthorn also occur in the woods with grey willow. Four small areas have been modified by the planting of Scot's pine and western hemlock. The ground flora is locally species-rich, varying according to the nature of the soils and drainage. Bramble and bluebell are abundant, while other common species include traveller's-joy, ground ivy, yellow archangel and enchanter's nightshade. Several locally uncommon plants occur in the woods including early purple orchid, greater butterfly orchid and greater burnet saxifrage. To the north the woods become progressively damper, with a subsequent increase in the number of sedges, including pendulous sedge and the locally-distributed thin-spiked wood sedge. Herb Paris also occurs in the damp areas, while the rare ivy-leaved water crowfoot is also found on some of the wet areas of Titsey Woods.
Site Condition - As described in citation/by site manager:	The part of the AW lying within the NAA is ThemeID1498882 which lies on the north side of the M25, part of which is 'Unit 4' of the SSSI. The condition of the SSSI Unit 4 was last assessed as 'favourable' by Natural England (26/05/21), with the following comment: 'There was some evidence of fallen deadwood in this unit. There is no evidence of removal of deadwood or Himalayan balsam. The west side of Unit 4 has a canopy of oak and ash with an understorey of field maple, hazel coppice, hawthorn and some cherry present. There are signs of nutrient enrichment here with larger coverage of cleavers and nettle, other ground flora species include, bramble, ground ivy, bugle, wild garlic, wood millet, dogs mercury, pendulous sedge and early purple orchid. Ash die back in Unit 4 is prominent, the West side especially. Natural England would advise the retention of resilient ash along with the all the field maple, oak and any tree species showing signs of leaf opening. The west side of the unit would benefit from being fenced after felling so regeneration can be much quicker to help restore the canopy.'
Dates surveyed (2021 and 2022):	21/07/22
Field survey habitat parcel descriptions:	The habitat recorded within the NAA was mature high forest with old hazel coppice. A difference was observed between the east and west of the woodland, with the canopy in western half dominated by ash with a field layer akin to W8, ash-field maple-dog's mercury woodland (i.e., it has frequent bluebell, tufted hair grass and dog's mercury). In the eastern half ash and oak are co-dominant, and field layer is more akin to w10 (i.e. it has bramble,

	honeysuckle and bluebell). The understorey had frequent hazel, hawthorn, blackthorn and field maple. Six AWIs were recorded, pendulous sedge, wood sedge, bluebell, wood millet, field rose and black bryony. The narrow road verge is largely planted with mainly a mixture of ash and field maple. A pheasant pen was present in the eastern half.
Lichens:	No lichens found
Vegetation gradient:	No vegetation gradient
Notes on active management (field survey observations):	No active management observed
Notes on required or beneficial management (field survey observations):	Reduce browsing pressure to allow more regeneration. Selective trees felling and coppicing to allow more light to reach the field layer.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	The 2022 survey observed ash die back and deer damage, as well as rubbish close to the roadside verge. Natural England's Views About Management (VAM) are generic and provide management principles for Titsey Wood, including the following: 1) make safe standing dead wood. 2) keep rides and glades open; 3) thinning, felling and coppicing to create or maintain variations in woodland structure; 4) deer management; 5) keep parts of wood unmanaged; and 6) control invasive species where they are a threat.
Ellenberg values:	min 3, max 8, mean 5.77.
Ellenberg value score 4 and below:	6 species EV4: silver birch, marsh thistle, tufted hair-grass, pedunculate oak, ragwort and heath speedwell; and European gorse EV3
Habitat type (UKHab category):	w1f Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 31)
Limitation(s):	The woodland was surveyed during dry conditions, when many field layer species were dead, including some understorey species.
Habitat sensitivity - Area affected by Ndep:	Survey of Titsey Wood recorded species with every EV between 3 and 8 inclusive. Six AWIs were present all with EV5 or above, indicating they do not have sensitivity to nitrogen. No nitrophobes were present. A total of 11 nitrophiles were present in the field layer, of which bramble EV6 was abundant and the following species frequent wood avens EV7, ground ivy EV7, Yorkshire fog EV5, bluebell EV7, dog's mercury EV7 and rough meadow grass EV6. The nitrogen sensitivities (Pitcairn et al.,2006) of these frequent species, where

	known, are as follows: Yorkshire fog has potential to increase with nitrogen, bluebell may respond to increased nitrogen in moist soils, dog's mercury and rough meadow grass and bramble are all known to respond to increased nitrogen. Species indicative of nutrient enrichment (i.e., common nettle and cleavers, both EV8) were occasional and rare respectively.

Assessment

Table 6.191 Titsey Woods SSSI: Assessment

Habitat used for calculation of LCL	Meso- and eutrophic *Quercus* woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	15
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 63.28 DM: 63.17 DS: 63.67
Operation - Ndep increase (max for site) kg N/ha/yr	0.5
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	3.32
Operation - increase over 0.4 kg N/ha/yr	0.1
Operation - impact extent (ha)	3.06

Operation - impact extent (% of site)	6.75
Operation - impact duration (years until emissions DS = DM at opening yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.98.1 The increase in N deposition (DS-DM) is 0.50kg N/ha/yr. The site-relevant CL range provided on APIS (CEH, 2022) is 15-20kg N/ha/yr for meso- and eutrophic *Quercus* woodland and the increase in N deposition is 3.3% of this LCL.
The site investigation did not observe a vegetation gradient or lichens. Part of the site containing AW (SSSI unit 4) was surveyed by NE in May 2021. It was assessed as 'favourable', though signs of nutrient enrichment and ash dieback was noted.
The site investigation, undertaken in July 2022 identified ash dieback, deer browsing pressure, and lack of management within the woodland NAA. Six AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Within the NAA no nitrogen sensitive AWI or nitrophobic species were identified. Eleven nitrophilic species were identified including abundant bramble (EV6) which is known to respond to increased levels of nitrogen, frequent Yorkshire fog (EV5) and bluebell (EV7). Six nitrogen sensitive species with an EV score of 4 and European gorse (EV3) were identified.
The typical woodland ground flora species recorded at this site, such as bluebell and dog's-mercury are nitrophiles and could increase in response to increased nitrogen. Therefore, these typical species are not predicted to be lost as a direct result of increased N deposition and it is unlikely that there will be a perceptible change in vegetation composition. Given the absence of nitrogen sensitive species and that only 6.7% of the designated site is affected, no impact on site integrity is anticipated.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 1 year, so is assessed as temporary and theoretically reversible.
Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.99 Tylers Wood SINC

Baseline

Table 6.192 Tylers Wood SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	514_LWS
Resource importance:	County
Overlapping site:	Jermains Wood SINC
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	14.54
Site Description - desk study:	A hilltop and valley side sloping down from the M25 motorway to a bridleway, with an arm projecting northwards beside the motorway up to a footbridge. Former arable land, it is now substantially open, sunny grassland sheltered by patches of maturing native broad-leaved trees, including much birch. Flowering plants include agrimony and knapweed. This provides good habitat for butterflies and also for reptiles (for which it is being managed). The northward projection beside Jermains Wood is kept wet by seepage off the motorway bank and has sheets of common fleabane and other damp-loving plants in summer. The steep motorway bank has patches of gorse. A stream/ditch meanders along the north-west boundary. Its treeline/hedge includes ash, oak, hornbeam and crack willow. Patches of brooklime and fool's-watercress grow on its banks. Provides supporting habitat for HvBI06 Tylers Common and links it with two ancient woodland SINCs –HvBII20 Jermains Wood and HvBII21 Foxburrow Wood. Also forms part of a wildlife corridor running alongside the M25 to its west. From: (https://democracy.havering.gov.uk/documents/s23941/Annex%2033%20-%20Havering%20SINC%20Review.pdf).
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed

Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.193 Tylers Wood SINC: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 54.23 DM: 52.27 DS: 52.76
Operation - Ndep increase (max for site) kg N/ha/yr	0.68
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	6.76
Operation - increase over 0.4 kg N/ha/yr	0.28
Operation - impact extent (ha)	2.76
Operation - impact extent (% of site)	18.96
Operation - impact duration (years until emissions DS = DM at opening yr)	>15
Mitigation proposed	Not required
Impact level	Minor adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.99.1 The SINC boundary overlaps with Jermains Wood SINC to the north. The increase in N deposition (DS-DM) is 0.68kg N/ha/yr. Site survey from Jermains Wood SINC, indicates that the part of the NAA adjacent to the M25 supports mixed scrub and glades of tall herbs which grades into woodland further into the site. The increase in N deposition is 6.8% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. No survey of the NAA specific to this SINC was completed in 2022. However, it overlaps Jermains Wood at the northern extent and that site investigation did not record

any lichen growth on trees or any existing gradient in the vegetation. No AWIs with EV values of 3 or 4 were recorded. The only species with EV 3 was hawkweed oxtongue, which is not a typical woodland species. Nitrophiles were frequent to abundant in the field layer, including bramble (EV6), bluebell, (EV6) and dog's mercury (EV7) (in Habitat parcel 2). Bramble and dog's mercury are known to respond to increased nitrogen and bluebell may respond to increased nitrogen in moist soils (Pitcairn et al, 2006). Other nitrophiles occurring with a frequency of occasional or rare are Yorkshire fog (EV5), false oat-grass (EV7) and nettle (EV8), an indicator of nutrient enrichment. Nitrophiles bramble (EV6), ivy (EV7) and nettle (EV8), which respond to increased N deposition (Pitcairn et al, 2006) were frequent in the field layer. The absence of sensitive AWI species and frequently recorded nitrophiles suggests there is unlikely to be an observable change in vegetation composition due to an increase in N deposition and no risk of loss of sensitive species. Considering the species composition and area affected (19% of the site), there is unlikely to be an effect on site integrity. The time taken for DS NO_x emissions to reduce to DM levels is estimated at >15 years, so is assessed as permanent and irreversible. Therefore, the impact level has been assessed as minor adverse. The effect of a minor impact level on a site of county value could be either neutral or slight. Given the absence of sensitive species and the precautionary measures adopted throughout the assessment, the effect is assessed as neutral (not significant).

6.100 Upminster Lodge Farm Horse Field SINC

Baseline

Table 6.194 Upminster Lodge Farm Horse Field SINC: Baseline

Designation:	SINC
AQ (Operation) model point codes:	524_LWS
Resource importance:	County
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	North
Site area (ha):	1.72
Site Description - desk study:	The site was designated in 2002 as Upminster Lodge Farm Horse Field SINC, a non-statutory Brough Grade 1 site, and lies to the north of the A127. The SINC citation describes the site comprising a hedgerow and a fairly diverse unimproved neutral grassland, with

	frequent crested dog's-tail, meadow barley, smaller cat's-tail and velvet bent, with common wild flowers such as common knapweed, greater bird's-foot-trefoil, meadow vetchling and common sorrel frequent throughout, and the field supports frequent pepper saxifrage, an indicator of unimproved grassland uncommon in London.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.195 Upminster Lodge Farm Horse Field SINC: Assessment

Habitat used for calculation of LCL	Neutral grassland (Low and medium altitude hay meadows)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	20
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 21.1 DM: 20.67 DS: 21.34
Operation - Ndep increase (max for site) kg N/ha/yr	0.67
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	3.33
Operation - increase over 0.4 kg N/ha/yr	0.27
Operation - impact extent (ha)	1.59
Operation - impact extent (% of site)	92.1
Operation - impact duration (years until emissions DS = DM at opening yr)	13
Mitigation proposed	Not required
Impact level	Moderate adverse

Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.100.1 No survey was undertaken in 2022 as no access was granted. The DM and DS N deposition are both within the critical load range for neutral grassland of 20-30kg N /ha/yr. The increase in N deposition (DS-DM) is 0.67kg N/ha/yr and 3.3% of the LCL. The LWS includes a hedgerow and a small area of neutral grassland, with potentially nitrogen-sensitive species such as common knapweed, greater bird's-foot-trefoil, meadow vetchling and common sorrel. The citation also states that the field supports frequent pepper saxifrage, an indicator of unimproved grassland uncommon in London. Approximately 92% of the designation is within the NAA.
As the presence of nitrogen-sensitive species could not be confirmed and a high proportion of the site is within the NAA, the precautionary approach is to assume that the integrity of the site could be affected. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 13 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as moderate adverse, which results in a slight effect (not significant).

6.101 Upper Brooms Wood AW ((AW_Theme_ID_1498405 (Object ID 11581))

Baseline

Table 6.196 Upper Brooms Wood AW ((AW_Theme_ID_1498405 (Object ID 11581)): Baseline

Designation:	AW
AQ (Operation) model point codes:	202_AW
Resource importance:	National
Overlapping site:	No
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	7.03

Site Description - desk study:	The site is designated AW and lies along the north side of the M2. The site is classified in the Ancient Woodland inventory for England as 'ancient and semi-natural woodland'. No further desk study information is available.
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	20/07/22
Field survey habitat parcel descriptions:	The ancient woodland within the NAA is old sweet chestnut coppice. The canopy is dominated by sweet chestnut with frequent oak and hornbeam, the latter frequent in the canopy and abundant in the understorey. The ground layer is species poor and dominated by bramble with frequent bluebell and rough meadow-grass. Four AWI were present: bluebell, wood melick, field rose and black bryony. The woodland is heavily used by walkers, with some areas of bare ground, compacted from trampling.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient observed
Notes on active management (field survey observations):	No active management
Notes on required or beneficial management (field survey observations):	Coppicing of sweet chestnut required to reduce shading of ground flora.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Vandalism - bark stripping of a young sweet chestnut coppiced tree close to the road, that has killed it and ash dieback.
Ellenberg values:	min 3, max, 8, mean 5.73.
Ellenberg value score 4 and below:	Two species of EV4: pedunculate oak and silver birch; One species EV3, bracken
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 28)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey of Brooms Wood AW recorded species with every EV between 3 and 8 inclusive. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to

	nitrogen. No nitrophobes were present. A total of seven nitrophiles were present in the field layer, the most common of which were dominant bramble EV6 (known to respond to increased nitrogen) frequent bluebell, EV6, (may respond to increased nitrogen in moist soils) and rough meadow grass, EV6, (known to respond to increased nitrogen) Pitcairn et al (2006). No vegetation gradient was observed. Species indicative of nutrient enrichment, EV8, were garlic mustard (rare) and cleavers, (occasional).

Assessment

Table 6.197 Upper Brooms Wood AW ((AW_Theme_ID_1498405 (Object ID 11581)): Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 55.13 DM: 49.52 DS: 50.51
Operation - Ndep increase (max for site) kg N/ha/yr	1.0
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	9.95
Operation - increase over 0.4 kg N/ha/yr	0.6
Operation - impact extent (ha)	2.23

Operation - impact extent (% of site)	31.69
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.101.1 The increase in N deposition (DS-DM) is 1kg N/ha/yr, which is 10% of the LCL for broadleaved deciduous woodland. The site investigation did not observe a vegetation gradient or lichens. There was evidence of ash dieback and vandalism within the NAA. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Within the NAA no nitrogen sensitive AWI or nitrophobic species were identified. Seven nitrophilic species were identified, which are likely to increase in response to increased N deposition, including dominant bramble (EV6), frequent bluebell (EV7) and rough meadow-grass (EV6).

Given the current species composition at the site and the dominance of bramble, it is unlikely that there will be a perceptible change in vegetation composition in the NAA. The NAA represents 31.7% of the site area, but no impact on site integrity is anticipated.

The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible.

Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.102 Westerham Wood SSSI

Baseline

Table 6.198 Westerham Wood SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	151_AW, 152_AW, 344_SSSI_AW, 345_SSSI_AW
Resource importance:	National
Overlapping site:	WESTERHAM WOOD (AW_Theme_ID 1499087) AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	43.26
Site Description - desk study:	The SSSI citation is as follows: 'This site is an example of one of the few remaining ancient woodlands on Gault Clay in Kent. The wood has a rich ground flora and an outstanding breeding bird community. Westerham Wood is composed largely of oak (*Quercus robur*) maidens with hazel (*Corylus avellana*) and ash (*Fraxinus excelsior*) coppice. A range of other native trees and shrubs is present, including hornbeam (*Carpinus betulus*), field maple (*Acer campestre*) and spindle (*Euonymus europaeus*). Traditional coppice-with-standards management can be traced back to the late eighteenth century and was continued until earlier this century when large amounts of timber were removed. Little management ensued up until the 1970s, when some coppicing was re-instated and a number of blocks were planted with conifers. Downwash from the Chalk and Upper Greensand has given rise to clays and sandy loams overlying much of the Gault Clay. The resultant variation in soil acidity and moisture content coupled with traditional management on a long-established woodland site, is reflected in the diverse ground flora. Bramble (*Rubus fruticosus*), dogs mercury (*Mercurialis perennis*) and bracken (*Pteridium aquilinum*) are most abundant, but 34 plant species indicative of ancient woodland also occur, including herb Paris (*Paris quadrifolia*), wood spurge (*Euphorbia amygdaloides*) and green hellebore (*Helleborus viridis*). Plants characteristic of wet woodland are an important feature, especially of the rides. Twelve sedge (*Carex* spp.) have been recorded, including thin-spiked wood-sedge (*C.*

	strigose) and pale sedge (*C. pallescens*) both of which are uncommon in Kent; common valerian (*Valeriana officinalis*) and opposite-leaved golden saxifrage (*Chrysosplenium oppositifolium*) are found in the northern part of the wood. In addition, 77 bryophyte species (mosses and liverworts) and almost 300 species of fungi have been recorded. The insect fauna is also diverse. There are a number of ponds within the wood including those in the south originating from a series of old marl workings. Although most are silted up and heavily shaded, a number of aquatic plant species do occur including fine-leaved water dropwort (*Oenanthe aquatica*), pink water-speedwell (*Veronica catenate*) and the water crowfoot (*Ranunculus aquatilis*). The latter species is scarce in Kent. Seven dragonfly species have been recorded from the pond in the vicinity and frogs and toads are frequent.'
Site Condition - As described in citation/by site manager:	Westerham Woods SSSI was assessed by Natural England (13/04/22) as being in 'favourable condition' with the following comments: ' This SSSI is now in favourable condition for both features, passing all the woodland attributes and proxy attributes for breeding birds. The woodland has a variety of habitat types including areas of wet non-intervention, non-intervention, coppice, wide floristically rich rides and glades. There is W8 & W10 ground flora throughout the site with an excellent species diversity including notable woodland species herb Paris, moschatel, opposite leaved golden saxifrage, primrose and yellow archangel. A large number of invertebrates were seen with the floral resources supporting a good number of pollinators. The woodland was being actively managed with coppicing and conifer removal, the rides are flailed later in the year and removal of arisings was recommended. Ash dieback is present on this site and is being monitored but is not a threat to the condition. Deer are also present on this site, but the current management is keeping the numbers under control, the browsing pressure is minimal and not affecting regeneration, the ground or shrub layers. There was plenty of lying and standing deadwood throughout the site, lots of open space, a variety of tree density and there was tree regeneration evident across the whole site. The breeding birds feature was assessed using proxy's and was found to be in favourable condition with plenty of resources and habitat types present, a lot of birds spotted on this visit including coal tits, chiffchaffs, jays and tree creepers.'
Dates surveyed (2021 and 2022):	27/07/22
Field survey habitat parcel descriptions:	The NAA covers mixed deciduous woodland. The Habitat parcel is bisected by a track running east west: on the M25- side, south of the track, lies secondary woodland with mainly young trees to 30 years. To the north of the track lies a more mature oak and ash woodland with a canopy of abundant ash and oaks to 50 cm DBH. The canopy included frequent

	downy birch and aspen, with rare wild cherry. Aspen stands were frequent with saplings and trees to 10m high. The understorey included abundant hazel, frequent aspen and occasional holly and hawthorn. A total of ten AWIs were recorded in the field layer, which included frequent bluebell and occasional pendulous sedge, wood sedge, wood spurge and field rose. Severe ash dieback was evident Bark stripping and frequent herbivory of shrubs were observed. Very dry and field layer often consists of leaf litter and bare ground, there are several large cherry laurel bushes clustered together just outside the Habitat parcel.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient was observed. It is likely that the secondary woodland growth close to the M25 follows from the motorway's construction; the secondary woodland has a denser canopy and denser bramble field layer that north of the track.
Notes on active management (field survey observations):	No obvious management in NAA apart from creation of brash barriers.
Notes on required or beneficial management (field survey observations):	Hazel coppicing and selective thinning of woodland to create more open spaces is recommended. Consider ash felling where it is a hazard, otherwise retain for its value as dead wood habitat.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Ash dieback and deer browsing are present at the site, although these are not considered a current threat (see Natural England's condition comments)
Ellenberg values:	min 3, max 8, mean 5.64.
Ellenberg value score 4 and below:	Eight species with EV4: silver birch, tufted hair grass, soft rush, oxeye daisy, primrose, fleabane, pedunculate oak and rowan; one species with EV3: compact rush
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 29)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 3 and 8 inclusive. Primrose (EV4), an AWI and a nitrophobe with potential sensitivity to nitrogen was recorded. The nitrophile ivy, EV7, was frequent in the field layer. Bramble, EV6, was abundant in the field layer and this species is known to respond to increased nitrogen (Pitcairn et al., 2006). The nitrophile

	bluebell, EV6, was frequent in the field layer; this species may respond to increased nitrogen in moist soils (Pitcairn et al., 2006). A further seven nitrophiles were present which were occasional or rare in the vegetation. Species indicative of nutrient enrichment with EV8 were common nettle, hedge woundwort and garlic mustard.

Assessment

Table 6.199 Westerham Wood SSSI: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 60.6 DM: 60.92 DS: 61.36
Operation - Ndep increase (max for site) kg N/ha/yr	0.44
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.37
Operation - increase over 0.4 kg N/ha/yr	0.04
Operation - impact extent (ha)	1.52
Operation - impact extent (% of site)	3.51

Operation - impact duration (years until emissions DS = DM at opening yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.102.1 The increase in N deposition (DS-DM) is 0.44kg N/ha/yr which is 4.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. The only AWI that is potentially sensitive to nitrogen is primrose (EV4). Nitrophilic species, including bramble, ivy and bluebell are frequent to abundant in the field layer and could increase in response to increased N deposition. These species could out-compete primrose, which is considered to be at risk of loss in the NAA as a result. However, given that the NAA is only 3.8% of the site, no impact on site integrity is anticipated. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 1 year, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.103 WESTERHAM WOOD (AW_Theme_ID 1499087) AW

Baseline

Table 6.200 WESTERHAM WOOD (AW_Theme_ID 1499087) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	151_AW, 152_AW, 344_SSSI_AW, 345_SSSI_AW
Resource importance:	National
Overlapping site:	Westerham Wood SSSI
Site in Order Limits:	No
Side of River Thames:	South

Site area (ha):	39.54
Site Description - desk study:	Westerham Wood AW lies almost entirely within Westerham Wood SSSI, whose citation is as follows: 'This site is an example of one of the few remaining ancient woodlands on Gault Clay in Kent. The wood has a rich ground flora and an outstanding breeding bird community. Westerham Wood is composed largely of oak (*Quercus robur*), maidens with hazel (*Corylus avellana*) and ash (*Fraxinus excelsior*) coppice. A range of other native trees and shrubs is present, including hornbeam (*Carpinus betulus*), field maple (*Acer campestre*) and spindle (*Euonymus europaeus*). Traditional coppice-with-standards management can be traced back to the late eighteenth century and was continued until earlier this century when large amounts of timber were removed. Little management ensued up until the 1970s, when some coppicing was re-instated and a number of blocks were planted with conifers. Downwash from the Chalk and Upper Greensand has given rise to clays and sandy loams overlying much of the Gault Clay. The resultant variation in soil acidity and moisture content coupled with traditional management on a long-established woodland site, is reflected in the diverse ground flora. Bramble (*Rubus fruticosus*), dogs mercury (*Mercurialis perennis*) and bracken (*Pteridium aquilinum*) are most abundant, but 34 plant species indicative of ancient woodland also occur, including herb Paris (*Paris quadrifolia*), wood spurge (*Euphorbia amygdaloides*) and green hellebore (*Helleborus viridis*). Plants characteristic of wet woodland are an important feature, especially of the rides. Twelve sedge *Carex* spp. have been recorded, including thin-spiked wood-sedge (*C. strigose*) and pale sedge (*C. pallescens*) both of which are uncommon in Kent; common valerian (*Valeriana officinalis)* and opposite-leaved golden saxifrage (*Chrysosplenium oppositifolium*) are found in the northern part of the wood. In addition, 77 bryophyte species (mosses and liverworts) and almost 300 species of fungi have been recorded. The insect fauna is also diverse. There are a number of ponds within the wood including those in the south originating from a series of old marl workings. Although most are silted up and heavily shaded, a number of aquatic plant species do occur including fine-leaved water dropwort (*Oenanthe aquatica*), pink water-speedwell (*Veronica catenate*) and the water crowfoot (*Ranunculus aquatilis*). The latter species is scarce in Kent. Seven dragonfly species have been recorded from the pond in the vicinity and frogs and toads are frequent.
Site Condition - As described in citation/by site manager:	Westerham Woods SSSI was assessed by Natural England (13/04/22) as being in 'favourable condition' with the following comments: ' This SSSI is now in favourable condition for both features, passing all the woodland attributes and proxy attributes for breeding birds. The woodland has a variety of habitat types including areas of wet non-intervention, non-intervention, coppice, wide floristically rich rides and glades. There is W8 & W10 ground

	flora throughout the site with an excellent species diversity including notable woodland species herb Paris, moschatel, opposite leaved golden saxifrage, primrose and yellow archangel. A large number of invertebrates were seen with the floral resources supporting a good number of pollinators. The woodland was being actively managed with coppicing and conifer removal, the rides are flailed later in the year and removal of arisings was recommended. Ash dieback is present on this site and is being monitored but is not a threat to the condition. Deer is also present on this site, but the current management is keeping the numbers under control, the browsing pressure is minimal and not affecting regeneration, the ground or shrub layers. There was plenty of lying and standing deadwood throughout the site, lots of open space, a variety of tree density and there was tree regeneration evident across the whole site. The breeding birds feature was assessed using proxy's and was found to be in favourable condition with plenty of resources and habitat types present, a lot of birds spotted on this visit including coal tits, chiffchaffs, jays and tree creepers.'
Dates surveyed (2021 and 2022):	27/07/22
Field survey habitat parcel descriptions:	The NAA covers mixed deciduous woodland. The Habitat parcel is bisected by a track running east west: on the M25- side, south of the track, lies secondary woodland with mainly young trees to 30 years. To the north of the track lies a more mature oak and ash woodland with a canopy of abundant ash and oaks to 50 cm DBH. The canopy included frequent downy birch and aspen, with rare wild cherry. Aspen stands were frequent with saplings and trees to 10m high. The understorey included abundant hazel, frequent aspen and occasional holly and hawthorn. A total of ten AWIs were recorded in the field layer, which included frequent bluebell and occasional pendulous sedge, wood sedge, wood spurge and field rose. Severe ash dieback was evident was bark stripping and frequent herbivory of shrubs was observed. Very dry and field layer often consists of leaf litter and bare ground, there are several large cherry laurel bushes clustered together just outside the Habitat parcel.
Lichens:	No lichens on suitable trees
Vegetation gradient:	No vegetation gradient was observed. It is likely that the secondary woodland growth close to the M25 follows from the motorway's construction; the secondary woodland has a denser canopy and denser bramble field layer that north of the track.
Notes on active management (field survey observations):	No obvious management in NAA apart from creation of brash barriers.

Notes on required or beneficial management (field survey observations):	Hazel coppicing and selective thinning of woodland to create more open spaces is recommended. Consider ash felling where it is a hazard, otherwise retain for its value as dead wood habitat.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Ash dieback and deer browsing are present at the site, although these are not considered a current threat (see Natural England's condition comments)
Ellenberg values:	min 3, max 8, mean 5.64.
Ellenberg value score 4 and below:	Eight species with EV4: silver birch, tufted hair grass, soft rush, oxeye daisy, primrose, fleabane, pedunculate oak and rowan; one species with EV3: compact rush
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 29)
Limitation(s):	None
Habitat sensitivity - Area affected by Ndep:	Survey recorded species with every EV between 3 and 8 inclusive. Primrose (EV4), an AWI and a nitrophobe with potential sensitivity to nitrogen was recorded. The nitrophile ivy, EV7, was frequent in the field layer. Bramble, EV6, was abundant in the field layer and this species is known to respond to increased nitrogen (Pitcairn et al., 2006). The nitrophile bluebell, EV6, was frequent in the field layer; this species may respond to increased nitrogen in moist soils (Pitcairn et al., 2006). A further seven nitrophiles were present which were occasional or rare in the vegetaiton. Species indicative of nutrient enrichment with EV8 were common nettle, hedge woundwort and garlic mustard.

Assessment

Table 6.201 WESTERHAM WOOD (AW_Theme_ID 1499087) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 60.6 DM: 60.92 DS: 61.36
Operation - Ndep increase (max for site) kg N/ha/yr	0.44
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	4.37
Operation - increase over 0.4 kg N/ha/yr	0.04
Operation - impact extent (ha)	1.52
Operation - impact extent (% of site)	3.84
Operation - impact duration (years until emissions DS = DM at opening yr)	1
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.103.1 The increase in N deposition (DS-DM) is 0.44kg N/ha/yr which is 4.4% of the LCL for broadleaved deciduous woodland of 10kg N/ha/yr. The site investigation did not record any lichen growth on trees or any existing gradient in the vegetation. The only AWI that is potentially sensitive to nitrogen is primrose (EV4). Nitrophilic species, including bramble, ivy and bluebell are frequent to abundant in the field layer and could increase in response to increased N deposition. These species could out-compete primrose, which is considered to be at risk of loss in the NAA as a result. However, given that

the NAA is only 3.8% of the site, no impact on site integrity is anticipated. The time taken for DS NO_x emissions to reduce to DM levels is estimated at 1 year, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in an effect of slight adverse (not significant).

6.104 Woodlands West of Shoreham LWS

Baseline

Table 6.202 Woodlands West of Shoreham LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	121_AW_LWS, 119_AW, 116_AW, 117_AW, 32_LWS_AW
Resource importance:	County
Overlapping site:	CONEYEARTH/PASCALLS/HOLLOWS WOODS (AW_Theme_ID 1499437) AW; ANDREWS WOOD(AW_Theme_ID 1499246) AW; AW_Theme_ID1499144 AW; AW_Theme_ID1499145 AW; AW_Theme_ID1499250 AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	222.21
Site Description - desk study:	The bulk of the site is a large complex of ancient woodlands with a large number of ancient woodland indicator species, including some plants which are scarce in Kent. The site also includes some species-rich, unimproved chalk grassland. The boundary is drawn to include all remaining blocks of this once contiguous woodland area and includes areas of unimproved grassland which are contiguous with the woodland. This large complex of woodland, grassland and scrub - which was once continuous from Polhill to Well Hill, Chelsfield but is now fragmented by the M25 and its link roads - still holds much of interest. A mosaic of woodland types is situated mainly on the plateau areas on acidic soils derived from clay with flints and sands. While there are extensive areas of managed chestnut coppice with both sessile and pedunculate oak standards, ancient broadleaved woodland species such as hornbeam, hazel, field maple, ash, whitebeam and Midland hawthorn are present both within the coppice and more generally in the derelict woodland areas. Where chalk is exposed on the sides of the dry valleys and on the Polhill scarp, beech is more

	frequent, although many trees fell in the 1987 storm. Beech and oak plantations occur in the southern part of the site, and some pockets of former conifer plantations are scattered throughout. Ancient woodbanks can be seen in places. The ground flora is rich and varied, dominated by bluebell (*Hyacinthoides non-scripta*) and wood anemone (*Anemone nemorosa*), with dog's mercury (*Mercurialis perennis*) on the chalk slopes. Over 50 species of ancient woodland indicator plants recorded include wood vetch (*Lathyrus montanus*), southern woodrush (*Luzula forsteri*), hairy woodrush (*L. Pilosa*), butcher's broom (*Ruscus aculeatus*), green hellebore (*Helleborus viridis*), lily-of-the-valley (*Convallaria majalis*) and orpine (*Sedum telephium*). Several woodland orchids occur, including white helleborine (*Cephalanthera damasonium*), broad-leaved helleborine (*Epipactis helleborine*) and greater butterfly-orchid (*Platanthera chlorantha*). Yellow bird's nest (*Monotropa hypopitys*) occurs in an old beech plantation. Dyer's greenweed (*Genista tinctoria*) has also been recorded. The area of downland on the Polhill scarp, now a Kent Wildlife Trust Reserve, is rich in chalk herbs, including common rock-rose (*Helianthemum nummularium*), man orchid (*Aceras anthropophorum*), bee orchid (*Ophrys apifera*), common-spotted orchid (*Dactylorhiza fuchsia*) and fragrant orchid (*Gymnadenia conopsea*). Dodder (*Cuscuta epithymum*) occurs in some local profusion at one of its few sites in West Kent. The very bare chalk cliff above the railway tunnel at Polhill supports a small colony of musk orchid (*Herminium monorchis*). Dwarf milkwort (*Polygala amarella*) has also been recorded here. Areas of scrub and regenerating woodland are developing in storm-damaged areas - some of which have been replanted with broadleaved tree species - and at the head of the Shepherds Barn valley. These sections are valuable for birds and therefore complement the site as a whole. Over 70 species of bryophyte have been recorded in the woodland areas, and a Cladonia heath is developing on the very thin acid soils of the southern plateau. The site supports important populations of both woodland and grassland fungi, including devil's bolete (*Boletus satanas*). The woodland contains several large active badger 10 setts, and deer frequent the area. Dormouse is also present. Bird interest is important, with many woodland birds including lesser spotted woodpecker, green woodpecker, great spotted woodpecker and breeding cuckoo. Nightingale has also been recorded. There is also an important invertebrate fauna, with lepidoptera having been regularly recorded over a number of years. Purple hairstreak and white admiral butterflies are among the species present. Hornet was recorded in damaged beech woodland.
Site Condition - As described in citation/by site manager:	Unknown

Dates surveyed (2021 and 2022):	No survey completed
Field survey habitat parcel descriptions:	N/A
Lichens:	N/A
Vegetation gradient:	N/A
Notes on active management (field survey observations):	N/A
Notes on required or beneficial management (field survey observations):	N/A
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Unknown
Ellenberg values:	N/A
Ellenberg value score 4 and below:	N/A
Habitat type (UKHab category):	N/A
Habitat condition - area affected by Ndep:	N/A
Limitation(s):	N/A
Habitat sensitivity - Area affected by Ndep:	N/A

Assessment

Table 6.203 Woodlands West of Shoreham LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10

Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 48.82 DM: 48.27 DS: 48.83
Operation - Ndep increase (max for site) kg N/ha/yr	0.56
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.56
Operation - increase over 0.4 kg N/ha/yr	0.16
Operation - impact extent (ha)	3.6
Operation - impact extent (% of site)	1.62
Operation - impact duration (years until emissions DS = DM at opening yr)	9
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.104.1 This LWS includes the following ancient woodlands - CONEYEARTH/PASCALLS/HOLLOWS WOODS (AW_Theme_ID 1499437) AW; ANDREWS WOOD (AW_Theme_ID 1499246) AW; AW_Theme_ID1499144 AW; AW_Theme_ID1499145

AW; AW_Theme_ID1499250 AW. These are of higher importance than the LWS and the effect of N deposition has been assessed for each of them. The LWS area affected is 1.6% of the site and the time taken for DS NO_x emissions to reduce to DM levels is estimated at 9 years, so is assessed as temporary and theoretically reversible. Given the small area affected, it is unlikely that an increase in N deposition could affect the integrity of the site. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.105 Wouldham to Detling Escarpment SSSI

Baseline

Table 6.204 Wouldham to Detling Escarpment SSSI: Baseline

Designation:	SSSI
AQ (Operation) model point codes:	185_SSSI, 186_SSSI_AW, 276_SSSI, 350_SSSI
Resource importance:	National
Overlapping site:	Blue Bell Hill Banks and Verges LWS
Site in Order Limits:	Yes
Side of River Thames:	South
Site area (ha):	311.18
Site Description - desk study:	Wouldham to Detling Escarpment SSSI is a large site of which units 7, 10, 11 and 15 are within 200m of the ARN. The SSSI is also partly included within the North Downs Woods SAC, which includes unit 15 of the SSSI, and unit 15 is included within the Boxley Warren LNR. The SAC and LNR have not been screened in for assessment. None of the areas of the site within 200m of the ARN are designated AW. The site is notified for its vascular plant and invertebrate assemblages, and calcareous grassland and broadleaved woodland habitats. The calcareous grassland habitat consists of the NVC plant communities CG2 *Festuca ovina-Avenula pratensis* grassland and CG3 *Bromus erectus* grassland, and the woodland consists of W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland, W12 *Fagus sylvatica-Mercurialis perennis* woodland and W13 *Taxus baccata* woodland.

	The SSSI citation describes the site as dominated by scrub and woodland with limited areas of open grassland. Although most of the woodland is recent in origin, it has acquired a rich community of plants and animals. The tree canopy is dominated by various proportions of beech, ash, whitebeam, wild cherry, silver birch and yew. Understorey shrubs include hazel, hawthorn, midland hawthorn, elder and privet, while the ground flora includes dog's mercury, ivy, lords-and-ladies and spurge laurel. Scarce plants include lady orchid and stinking hellebore. Box, a rare small tree, is native here at one of a handful of sites in the south-east. Scrub on the site includes the full range of succession from open grassland to the woodland already mentioned. Scattered clumps of hawthorn and wild rose gradually merge and a varied scrub develops, with more than a dozen shrub species, including dogwood, privet, hazel, hawthorn, wayfaring tree, yew and box. Chalk grassland survives as fragments within the scrub, and a number of larger areas also occur. The most open areas are dominated by fine grasses including red and sheep's fescues, with low-growing broadleaved plants such as stemless thistle, fairy flax, bulbous buttercup, wild thyme and salad burnet. Most of the grassland is taller, dominated by upright brome with broadleaved plants including hairy violet, marjoram and cowslip. Other plants in the grassland include a number of orchids – fragrant orchid, common spotted orchid, twayblade and pyramidal orchid, several plants scarce in Kent such as chalk milkwort, dropwort, burnet rose and adder's-tongue fern, several nationally scarce species such as man orchid and ground pine, and the nationally rare meadow clary.
Site Condition - As described in citation/by site manager:	The condition of the SSSI units was last assessed by Natural England in 2018, which found unit 7 to be 'unfavourable - declining', while units 10, 11 and 15 were 'favourable'. Unit 7 was assessed as unfavourable due to the absence of active management and high scrub cover and sward height within the three areas of open grassland. Units 10, 11 and 15 are described in the condition assessment as being managed as non-intervention mature woodlands, dominated by oak with ash, field maple, whitebeam and occasional turkey oak, with shrub layer of hazel, hawthorn and blackthorn dense in places. The ground flora is described as sparse or comprised of bramble, common nettles or ivy. It was noted that there was sufficient standing and fallen deadwood and that negative indicators were absent.
Dates surveyed (2021 and 2022):	26/06/22, 05/07/22 and 02/08/22

Field survey habitat parcel descriptions:	Habitat parcel 1 (276_SSSI): The transect was divided into two because the east-west (E-W) section (Transect 1) is significantly different to the north-south (N-S) section (Transect 1). The E-W section has frequent to abundant sycamore and ash and with an understorey of frequent privet. Ivy is abundant as field layer and on trees. The adjacent area which was not surveyed as it lies outside the NAA has abundant hornbeam with ash but little sycamore. The land rises sharply just before the road by four metres. The soils are dry and chalky with significant flint nodules. There is considerable disturbance from mountain bike/motorbike track construction, with tracks up to 2m which is having detrimental effect on the hornbeam which has died and fallen over probably due to root damage from these activities. There is a litter from the road but not excessive. The N-S section is sycamore dominated with elder as the main understorey species. Evidence of historic littering, with rubbish accumulated at bottom of slope from road above. Few AWIs. High cover of steep bare ground and nettle. Habitat parcel 2 (276_SSSI): Calcareous grassland with a short sward of mainly forbs and sedges. Approximately 35 species with 22 recorded in a 2 x 2 m plot. Clear signs of rabbit grazing keeping the sward short. Scrub encroachment and numerous sycamore ceilings starting to invade where the grassland is close to the scrub boundary. Tor grass is also becoming invasive in areas particularly beneath scattered scrub. In general grassland is in good condition but will need management to retain its status. Habitat parcel 3 (350_SSSI): Woodland appears to be a plantation because many of the oaks are non-native, almost certainly Turkey oaks. The oak standards are approximately 15 m high with occasional yew and rare sycamore. The understorey has frequent hazel, not yet coppiced, with occasional dog wood, field maple and blackthorn. The field layer is almost totally leaf litter and bare ground. Frequent ash and dogwood seedlings. AWI rare, including broad leaved helleborine and bluebell on the path sides. Some evidence of herbivory, mainly to dogwood. Chalk soils with flint nodules abundant. The wood is situated on a steep slope, approximately 25 degrees. Habitat parcel 4 (350_SSSI): The canopy comprised frequent yews, beech and sycamore, with occasional ash. Many large and medium-sized trees are fallen, most of which have survived and sent up new shoots. Some shoots 50 cm circumference. These prostrate trees provide valuable habitat for wildlife. Younger trees have been partially wind-blown, at an angle of 20° or more with their roots sometimes partially exposed. Field layer has locally abundant ivy with some ash and cherry seedlings. The majority is leaf litter. There are no signs of grazing damage some open areas with locally abundant ivy and cherry saplings and some low growing privet.

	Habitat parcel 5 (350_SSSI): This woodland is a plantation (estimated tree age 20 to 30 years and no mature trees) as nearly all the trees had tree guards at their bases, except for the yews. It is unknown whether the yew trees had been planted. The woodland was on a very steep slope, 25 to 35 degrees. Frequently occurring species in the canopy were beech, sycamore, ash and yew. Cherry and yew were occasional in the understorey. The trees seem healthy with the exception of the ash which has quite severe dieback. There is some bark stripping noted on one tree. It is probably too steep and with too little field layer to make it attractive to large herbivores. The field layer had abundant leaf litter, although at the margins bramble and ivy are growing. There were some AWIs found in the centre of the wood, grouped together in a small area. Habitat parcel 6. This Habitat parcel was viewed from the road and no access was allowed. The habitat was mature woodland with a canopy of abundant pedunculate oak and ash with frequent hornbeam and sycamore. The understorey had frequent hazel coppice with occasional field maple, traveller's joy, hawthorn, holly and elder. The ground layer included frequent bluebell, ivy, dog's mercury bramble and common nettle. Two AWIs were recorded, bluebell and stinking iris, viewed from the road, but others may be present. There were negative impacts through the dumping of waste and wood chip. Numerous signs up forbidding entry.
Lichens:	No lichens present on suitable trees
Vegetation gradient:	Habitat parcel 1: Abundant ivy cover across Habitat parcel. The only evidence of a nitrogen gradient is a field layer predominantly ivy but 20 metres away from the road dog's mercury begins to appear. This could be an edge effect. Habitat parcels 2, 3, 4 and 5: no vegetation gradient; Habitat parcel 6: No visible vegetation gradient. Nettle is scarce by the A229 and much more common at the eastern end along Warren Road.
Notes on active management (field survey observations):	Habitat parcel 1: no active management was observed. Habitat parcel 2: No obvious management but is clearly grazed by rabbits, with no sign of grazing by domestic animals. Habitat parcel 3, 4, 5 (350_SSSI): no active management observed. Habitat parcel 6: an extensive area of dumped wood chip and stumps, partially burying black bin bags. Other piles of wood chip and cut logs visible further into the woodland.
Notes on required or beneficial management (field survey observations):	Habitat parcel 1: Controlled access to prevent mountain/motor bike access. Removal of rubbish needed. Habitat parcel 2: Needs scrub control because sycamore and hawthorn are invading. Tor grass also invading particularly around scrub. Habitat parcel 3: Gradual removal of turkey oak creating open spaces. Install bird boxes as trees are immature. Hazel

	was frequent and the site, and the woodland could have dormice potential. Habitat parcel 4: This area has many fallen, but still living mature trees, which provide valuable habitat, and should be retained in-situ. Habitat parcel 5: remove the tree guards which have been in place for many years. Install bird boxes on trees, as there are no mature trees for birds to nest in. Allow holes in fences for mammal passage.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Habitat parcels 1 and 2: Scrub encroachment of chalk grassland. Mountain/motor bike use causing disturbance to wildlife and soil compaction and subsequent soil damage. Litter is frequent, with signs of wild camping. Habitat parcel 3: The non-native species Turkey oak is frequent. Habitat parcel 5: lack of management, with abundant ivy. Habitat parcel 5: severe ash dieback observed.
Ellenberg values:	Habitat parcel 1, transect 1: min 2, max 8, mean 5.52. Habitat parcel 1, transect 2: min 5, max 8, mean 6.57. Habitat parcel 2, transect 3 (grassland): min 1, max 7, mean 3.8. Habitat parcel 3: min 2, max 8, mean 6.0. Habitat parcel 4 min 5, max 6, mean 5.58. Habitat parcel 5: min 4, max 8, mean 6.17.
Ellenberg value score 4 and below:	Habitat parcel 1, transect 1: Silver birch EV4; Scots pine EV2 and hairy violet EV2. Habitat parcel 1, transect 2, no species with EV4 or fewer. Habitat parcel 2 (grassland) Species with EV 4: yarrow, hedge bedstraw, oxeye daisy, marjoram, yellow oat-grass. Species with EV 3: pyramidal orchid, tor-grass, quaking grass, upright brome, dwarf thistle, rough hawkbit, cowslip, salad burnet; Species with EV2: yellow wort, glaucous sedge, fairy flax, common bird's foot trefoil, mouse ear hawkweed and wild thyme. Habitat parcel 3: species with EV4 broad leaved helleborine and wild strawberry; and hairy violet EV2. Habitat parcel 4: min 5, max 6, mean 5.58 Habitat parcel 5: wild strawberry EV4.
Habitat type (UKHab category):	Habitat parcel 1: w1f - Lowland mixed deciduous woodland. Habitat parcel 2: g2a5 - Dry grasslands and scrub on chalk or limestone; lowland (H6210); Habitat parcel 3: w1g - other woodland broadleaved; Habitat parcel 4: w1f lowland mixed deciduous woodland Habitat parcel 5: w1g - other woodland broadleaved. Habitat parcel 6: w1f - Lowland mixed deciduous woodland.
Habitat condition - area affected by Ndep:	Habitat parcel 1 (woodland): moderate (score 32). Habitat parcel 2 (grassland): good, passing 5 out of 6 criteria. Habitat parcel 3: poor (score 22) Habitat parcel 4: moderate (score 32) Habitat parcel 5: score 23 (poor)
Limitation(s):	None

Habitat sensitivity - Area affected by Ndep:	The NAA supports calcareous grassland and woodland habitats with a number of species with low EVs that are potentially sensitive to nitrogen.

Assessment

Table 6.205 Wouldham to Detling Escarpment SSSI: Assessment

Habitat used for calculation of LCL	Broadleaved, mixed and yew woodland (Taxus baccata woodland)
LCL associated with site (worst case used in AQ model) kg N/ha/yr	5
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 47.82 DM: 44.85 DS: 46.25
Operation - Ndep increase (max for site) kg N/ha/yr	1.54
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	30.73
Operation - increase over 0.4 kg N/ha/yr	1.14
Operation - impact extent (ha)	10.09
Operation - impact extent (% of site)	3.24
Operation - impact duration (years until emissions DS = DM at opening yr)	12

Mitigation proposed	No feasible mitigation available, see PAQAP Appendix 5.6 (Application Document 6.3)
Impact level	Major adverse
Level of significance	Significant
Compensation proposed	New habitat creation within compensation sites, see PAQAP Appendix 5.6 (Application Document 6.3)

Assessment Rationale

6.105.1 Wouldham to Detling Escarpment SSSI is a large site of over 300ha. The southern half overlaps with North Downs Woodlands SAC. The maximum increase in N deposition (DS-DM) is 1.54kg N/ha/yr. The lowest site-relevant CL range provided on APIS (CEH, 2022) is 5-15kg N/ha/yr for broadleaved, mixed and yew woodland (*Taxus baccata* woodland), which is categorised as coniferous woodland. The increase in N deposition is 30.7% of this LCL. The SSSI is designated for a number of woodland and grassland habitats which have higher critical load ranges and are less sensitive to N deposition than yew woodland. There are three NAAs, either side of the A229.

The most northern NAA to the west of the A229 coincides with Units 7 and 10 of the SSSI and was surveyed as Habitat parcels 3, 4 and 5 in the 2022 site surveys. These are woodland habitats, with some yew (possibly planted) and several AWI. Species with low EVs that could be sensitive to N deposition include wild strawberry, broad-leaved helleborine and hairy violet. Bluebell is also an AWI but is a nitrophile and is known to respond to increased N deposition in moist soils (Pitcairn et al, 2006). Bramble and ivy, which are both nitrophiles, were also present and could further expand under increased N deposition.

The other NAA on the west side of the A229 is further south and supports both woodland and grassland (Habitat parcels 1 and 2 in the site survey, Units 12 and 13 of the SSSI). This area of woodland showed signs of damage due to recreational pressure and evidence of litter. The vegetation showed signs of nutrient enrichment, with nettle abundant in places, but hairy violet (EV 2) is also present (but not AWI). The calcareous grassland area further from the road is being encroached by scrub but supported several species of EV4, including yarrow, hedge bedstraw, ox-eye daisy, marjoram and yellow oat-grass.

The NAA on the east side of the A229 overlaps with Blue Bell Hill Banks and Verges LWS. This area could not be accessed for survey but was viewed from the road. The habitat was mature oak and ash woodland, with frequent hornbeam and sycamore. Two AWIs were seen: bluebell and stinking iris. The ground layer was dominated by nitrophilic species that could further increase under increased N deposition, including bluebell, ivy, dog's mercury, bramble and common nettle.

Therefore, there are nitrogen-sensitive species in the NAA that are persisting in current and historic high levels of N

deposition, but further increases could put these species at risk of loss. There is other typical woodland ground flora that could increase in response to increased N deposition, such as dog's mercury, bluebell and bramble. Species indicative of nutrient enrichment such as nettle could also increase in cover as a result of increased N deposition.
The total area predicted to be affected by N deposition greater than the 0.4kg N/ha/yr screening threshold is 10.09ha. This represents a small proportion (3.2%) of the designation.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 12 years, so is assessed as temporary and theoretically reversible. Given the presence of sensitive species, there is a risk that these could be out-competed by species more responsive to increased N deposition and the vegetation composition in the affected parts of the site could change. Although the NAA is a small proportion of the site as a whole, the magnitude of increase in N deposition is high and it is therefore precautionary to assume there could be an effect on site integrity. However, it is of note that the site is showing signs of other external pressures such as recreation and dumping of waste that could be exerting more influence on vegetation composition and site condition than N deposition from the adjacent roads.
Therefore, the impact level has been assessed as moderate adverse. The effect of a moderate impact level on a site of national value could be either moderate or large. Given that the NAA is a small percentage of the designation and the precautionary measures adopted throughout the assessment, the resulting effect is assessed as moderate adverse (significant).

6.106 Yaugher Wood (AW_Theme_ID 1498451) AW

Baseline

Table 6.206 Yaugher Wood (AW_Theme_ID 1498451) AW: Baseline

Designation:	AW
AQ (Operation) model point codes:	207_AW, 51_LWS_AW, 52_LWS_AW
Resource importance:	National
Overlapping site:	Yaugher Woods LWS
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	19.16

Site Description - desk study:	The site description for Yaugher Woods LWS is as follows: 'The site comprises an area of ancient woodland shown on the ancient woodland inventory. The area is no longer actively managed as sweet chestnut coppice but includes some mixed coppice and small nearby areas of unmanaged mixed coppice. The woodland is mostly situated on the plateau clays, but more calcareous areas occur in a shallow valley in Yaugher Woods. Standard beech, sessile and pedunculate oak are very occasional in some parts. Hornbeam, ash, hazel and, less commonly, field maple, are other coppice species. Bluebell (*Hyacinthoides non-scripta*) and wood anemone (*Anemone nemorosa*) are dominant in the ground flora. Bramble (*Rubus fruticosus* agg.) occurs but is never dominant. 25 ancient woodland indicator species have been recorded from the site and 18 on a recent brief visit. These include early purple orchid (*Orchis mascula*), which is often abundant (particularly in Reeds Shaw), wood sorrel (*Oxalis acetosella*), heath cudweed (*Gnaphalium sylvaticum*), yellow archangel (*Galeobdolon luteum*), pignut (*Conopodium majus*) and butcher's-broom (*Ruscus aculeatus*). The open rides and areas below the pylons are the most diverse. Close to the M2 motorway are more open and scrubby areas with good numbers of mature beech and oak.'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	24/07/22
Field survey habitat parcel descriptions:	The ancient woodland has abundant hornbeam, sweet chestnut and ash all of which have been coppiced around 30 years ago, growing from ancient stools. Coppiced hornbeam and hazel are also frequent in understorey. The woodland is heavily shaded with a sparse field and ground layer. There are open areas towards motorway which are characteristic of W8 (ash-field maple-dog's mercury) woodland, with abundant dog's-mercury. Four AWI were recorded in the field layer as follows: wood sedge, bluebell and black bryony (all occasional) and field rose, rare. A footpath runs through the wood but it does not seem to be well used.
Lichens:	No lichens observed.
Vegetation gradient:	No vegetation gradient observed.
Notes on active management (field survey observations):	Coppicing of sweet chestnut, hornbeam and birch approximately 20 years ago.

Notes on required or beneficial management (field survey observations):	The trees require thinning to allow more light to reach the field layer to encourage woodland ground flora and tree regeneration.
Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Lack of recent coppice i.e. in the last 1 - 2 years; Rubbish is being dumped next to road/footpath.
Ellenberg values:	min 3, max 8, mean 5.57.
Ellenberg value score 4 and below:	Species with EV4: silver birch, broom, and pedunculate oak; species with EV3: clustered bell flower and bracken.
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 28)
Limitation(s):	Transect shortened as dense scrub made route impassable
Habitat sensitivity - Area affected by Ndep:	Survey of Yaugher Woods AW/LWS recorded species with every EV between 3 and 8 inclusive. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. No nitrophobes were present. A total of four nitrophiles were present in the field layer, of which dog's-mercury, EV7, was frequent to locally abundant. Dog's-mercury is known to respond to increased nitrogen (Pitcairn et al., 2006). The other nitrophiles were bluebell, EV6, (may respond to increased nitrogen in moist soils) which was occasional, wood avens EV7, which was rare, and nettle, EV8 (an indicator of nutrient enrichment), also rare. Hedge woundwort, EV8, was rare.

Assessment

Table 6.207 Yaugher Wood (AW_Theme_ID 1498451) AW: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only

Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A
Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 43.87 DM: 40.54 DS: 41.08
Operation - Ndep increase (max for site) kg N/ha/yr	0.54
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.39
Operation - increase over 0.4 kg N/ha/yr	0.14
Operation - impact extent (ha)	0.25
Operation - impact extent (% of site)	1.3
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.106.1 The increase in N deposition (DS-DM) is 0.54kg N/ha/yr. The NAA supports mixed deciduous woodland. A precautionary LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been used and the increase in N deposition is 5.4% of this LCL.
No lichens or vegetation gradient were observed during the site investigation. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Three species were identified with an EV of 4 and two with an EV of 3, clustered bell flower and bracken. A total of four nitrophiles were present in the field layer, including frequent to locally abundant dog's-mercury. No nitrophobes were present.
Additional N deposition may lead to an increase in nitrophilic species, such as bramble. However, considering that only 1.3% of the site is predicted to be affected, this is unlikely to affect the site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as a temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse, which results in a slight adverse effect (not significant).

6.107 Yaugher Woods LWS

Baseline

Table 6.208 Yaugher Woods LWS: Baseline

Designation:	LWS
AQ (Operation) model point codes:	206_AW_LWS, 50_LWS, 51_LWS_AW, 52_LWS_AW
Resource importance:	County
Overlapping site:	REED'S SHAW (AW_Theme_ID 1498441) AW, Yaugher Wood (AW_Theme_ID 1498451) AW
Site in Order Limits:	No
Side of River Thames:	South
Site area (ha):	23.02
Site Description - desk study:	The site description for Yaugher Woods LWS is as follows: 'The site comprises an area of ancient woodland shown on the ancient woodland inventory. The area is no longer actively

	managed as sweet chestnut coppice but includes some mixed coppice and small nearby areas of unmanaged mixed coppice. The woodland is mostly situated on the plateau clays, but more calcareous areas occur in a shallow valley in Yaugher Woods. Standard beech, sessile and pedunculate oak are very occasional in some parts. Hornbeam, ash, hazel and, less commonly, field maple, are other coppice species. Bluebell *Hyacinthoides non-scripta* and wood anemone *Anemone nemorosa* are dominant in the ground flora. Bramble *Rubus fruticosus* agg. occurs but is never dominant. 25 ancient woodland indicator species have been recorded from the site and 18 on a recent brief visit. These include early purple orchid *Orchis mascula*, which is often abundant (particularly in Reeds Shaw), wood sorrel Oxalis acetosella, heath cudweed *Gnaphalium sylvaticum*, yellow archangel *Galeobdolon luteum*, pignut *Conopodium majus* and butcher's-broom *Ruscus aculeatus*. The open rides and areas below the pylons are the most diverse. Close to the M2 motorway are more open and scrubby areas with good numbers of mature beech and oak.'
Site Condition - As described in citation/by site manager:	Unknown
Dates surveyed (2021 and 2022):	24/07/22
Field survey habitat parcel descriptions:	One Habitat parcel within Yaugher Woods was surveyed in 2022.The ancient woodland has abundant hornbeam, sweet chestnut and ash all of which have been coppiced around 30 years ago, growing from ancient stools. Coppiced hornbeam and hazel are also frequent in understorey. The woodland is heavily shaded with a sparse field and ground layer. There are open areas towards motorway which are characteristic of W8 (ash-field maple-dog's mercury) woodland, with abundant dog's-mercury. Four AWI were recorded in the field layer as follows: wood sedge, bluebell and black bryony (all occasional) and field rose, rare. A footpath runs through the wood but it does not seem to be well used.
Lichens:	No lichens observed.
Vegetation gradient:	No vegetation gradient observed.
Notes on active management (field survey observations):	Coppicing of sweet chestnut, hornbeam and birch approximately 20 years ago.
Notes on required or beneficial management (field survey observations):	The trees require thinning to allow more light to reach the field layer to encourage woodland ground flora and tree regeneration.

Pressures and threats - As described in citation/by site manager and from observations during site investigations:	Lack of recent coppice i.e. in the last 1 - 2 years; Rubbish is being dumped next to road/footpath.
Ellenberg values:	min 3, max 8, mean 5.57.
Ellenberg value score 4 and below:	Species with EV4: silver birch, broom, and pedunculate oak; species with EV3: clustered bell flower and bracken.
Habitat type (UKHab category):	w1f - Lowland mixed deciduous woodland
Habitat condition - area affected by Ndep:	Moderate (score 28)
Limitation(s):	Transect shortened as dense scrub made route impassable
Habitat sensitivity - Area affected by Ndep:	Survey of Yaugher Woods AW/LWS recorded species with every EV between 3 and 8 inclusive. Four AWI were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. No nitrophobes were present. A total of 4 nitrophiles were present in the field layer, of which dog's-mercury, EV7, was frequent to locally abundant. Dog's-mercury is known to respond to increased nitrogen (Pitcairn et al.,2006). The other nitrophiles were bluebell, EV6, (may respond to increased nitrogen in moist soils) which was occasional, wood avens EV7, which was rare, and nettle, EV8 (an indicator of nutrient enrichment), also rare. Hedge woundwort, EV8, was rare.

Assessment

Table 6.209 Yaugher Woods LWS: Assessment

Habitat used for calculation of LCL	Broad-leaved deciduous woodland
LCL associated with site (worst case used in AQ model) kg N/ha/yr	10
Project phase ARN (Construction and /or Operation)	Operation only
Construction Ndep Base/DM/DS (max for site) kg N/ha/yr	N/A
Construction – impact extent (ha)	N/A

Construction - years where impact exceeds 0.4 kg N/ha/yr	N/A
Operation - Ndep Base/DM/DS (max for site) kg N/ha/yr	Base: 43.87 DM: 40.54 DS: 41.08
Operation - Ndep increase (max for site) kg N/ha/yr	0.54
Operation - Increase as % LCL (based on LCL for AQ pts associated with site)	5.39
Operation - increase over 0.4 kg N/ha/yr	0.14
Operation - impact extent (ha)	0.37
Operation - impact extent (% of site)	1.63
Operation - impact duration (years until emissions DS = DM at opening yr)	3
Mitigation proposed	Not required
Impact level	Negligible adverse
Level of significance	Not significant
Compensation proposed	Not required

Assessment Rationale

6.107.1 The increase in N deposition (DS-DM) is 0.54kg N/ha/yr. There are two separate NAAs within this LWS. Both NAAs support mixed deciduous woodland. A precautionary LCL of 10kg N/ha/yr (broadleaved deciduous woodland) has been used and the increase in N deposition is 5.4% of this LCL. One NAA within this LWS (also known as Reed's Shaw (AW_Theme_ID 1498441)) was not surveyed as access was not granted. However, this is not deemed to be a significant constraint to the survey as the NAA not subject to survey is approximately 20m west of the NAA that was surveyed, and aerial imagery suggests the habitat is similar.
No lichens or vegetation gradient was observed during the site investigation. Four AWIs were present, all with EV5 or above, indicating they do not have sensitivity to nitrogen. Three species were identified with an EV of 4 and two with an

EV of 3, clustered bell-flower and bracken. A total of four nitrophiles were present in the field layer, including frequent to locally abundant dog's mercury. No nitrophobes were present.
Additional N deposition may lead to an increase in nitrophilic species, such as bramble. However, considering that only 1.6% of the site is predicted to be affected, this is unlikely to affect the site integrity.
The time taken for DS NO_x emissions to reduce to DM levels is estimated at 3 years, so is assessed as temporary and theoretically reversible. Therefore, the impact level has been assessed as negligible adverse. The effect of a negligible adverse impact level on a site of county value could be either neutral or slight. Given the small area affected and the precautionary measures adopted throughout this assessment, this is considered to result in a neutral effect (not significant).

7 Summary

7.1.1 A total of 146 designated sites were screened in for assessment due to increased N deposition, comprising the following: one SAC, nine SSSI, 52 AW, 22 VTs and 62 LWS (including 22 SINC and one LNR). However, a number of these sites are affected by overlapping designations. Table 2.4 indicates there are 36 overlaps, which includes 24 AWs also designated as LWS or SINC and eight AWs and two LWS overlapping with SSSIs.

7.1.2 During construction, 33 designated sites were screened in. Of these, 10 were also affected during operation. Due to the temporary nature of the increase in N deposition, none of the sites that were affected during the construction phase only were assessed as having significant effects (Table 7.1).

7.1.3 In the operational phase, 123 sites were screened in for assessment (including the 10 also affected during construction). These comprise: one SAC, nine SSSI, 43 AWs, 19 VTs and 51 LWS (including 19 SINC and 1 LNR).

7.1.4 Of the sites screened in for operation, the effects on 29 sites were assessed as significant. Of these, four were SSSI, 22 AWs and three LWS (including one SINC). A summary of the assessment is presented in Table 7.2.

7.1.5 Following the identification of significant effects, the mitigation hierarchy of avoid, mitigate, compensate was followed to address the effects. Avoidance was achieved as far as possible within the Project objectives through design. A number of potential mitigation options were considered and feasible mitigation measures (in the form of speed management measures on the M2) have been adopted to minimise the residual significant effects.

7.1.6 As a result of the speed management measures on the M2, four sites were screened out and not subject to detailed assessment (Section 6.2). The magnitude of change in N deposition would be reduced at a further four sites:

a. AW_Theme_ID_1498718 AW

b. Frith Woods Etc., Kits Coty LWS

c. Frith/Impton Woods AW

d. Impton/Podkin Wood AW

7.1.7 However, the reduction was not sufficient to change the assessment of effects on these sites, with the effect on AW_Theme_ID_1498718 AW assessed as significant following mitigation and the other three sites were not significant both before and after mitigation.

7.1.8 A number of potential compensation measures were considered, and feasible measures have been proposed to fully compensate for residual significant effects. The compensation strategy proposed consists of landscape scale habitat creation to build resilience of the ecological networks that support the affected sites / habitats and therefore build the resilience of the affected sites / habitat themselves. Details of the strategy and the consideration of the mitigation hierarchy can be seen in the Project Air Quality Action Plan (Appendix 5.6, Application document 6.3).

Table 7.1 Summary of impact assessment for the construction phase

Site Name	Importance	Impact level	Effect	Significance
803_VT	National	Negligible adverse	Slight adverse	Not significant
804_VT	National	Negligible adverse	Slight adverse	Not significant
805_VT	National	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID1420009 AW	National	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID1420010 AW	National	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID1487077 AW	National	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID1487086 AW	National	No change	Neutral	Not significant
AW_Theme_ID1487106 AW	National	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID1495743 AW	National	Negligible adverse	Slight adverse	Not significant
Low Well Wood (AW_Theme_ID 1505468) AW	National	Negligible adverse	Slight adverse	Not significant
MILL WOOD (AW_Theme_ID 1119931) AW	National	Negligible adverse	Slight adverse	Not significant
ROUND SHAW (AW_Theme_ID 1119930) AW	National	Negligible adverse	Slight adverse	Not significant
Arena Essex, West Thurrock LWS	County	Negligible adverse	Neutral	Not significant
Arisdale Avenue LWS	County	No change	Neutral	Not significant
Brickbarn Wood and Coombe Wood, South Ockendon LWS	County	Negligible adverse	Neutral	Not significant
Low Well Wood, South Ockendon LWS	County	Negligible adverse	Slight adverse	Not significant
Mar Dyke LWS	County	Negligible adverse	Neutral	Not significant
Straight Path Shaw LWS	County	Negligible adverse	Neutral	Not significant
Thick/Hollow Bottom Shaws LWS	County	Negligible adverse	Neutral	Not significant
Tilbury Marshes LWS	County	No change	Neutral	Not significant

Site Name	Importance	Impact level	Effect	Significance
Codham Hall Wood West SINC	County	Negligible adverse	Slight adverse	Not significant
Cranham Hall Shaws and Pasture SINC	County	Negligible adverse	Neutral	Not significant
Puddle Dock Angling Centre SINC	County	No change	Neutral	Not significant

Table 7.2 Summary of impact assessment for operation (sites assessed as significant are highlighted)

Site Name	Importance	Impact phase	Impact level	Effect	Significance
Epping Forest SAC	International	Operation only	Negligible adverse	Slight adverse	Not significant
23_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
27_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
401_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
403_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
410_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
424_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
426_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
438_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
643_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
649_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
652_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
667_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
668_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
669_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
670_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
671_VT	National	Operation only	Negligible adverse	Slight adverse	Not significant
744_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
745_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
752_VT	National	Operation only	Minor adverse	Slight adverse	Not significant
ANDREWS WOOD (AW_Theme_ID 1499246) AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID_1486679 (Object ID 9096) AW	National	Operation only	Major adverse	Large adverse	Significant
AW_Theme_ID_1486820 (A2/M2 ROUNDABOUT) AW	National	Operation only	Major adverse	Large adverse	Significant
AW_Theme_ID_1486860 (Shorne Woods) AW	National	Operation only	Major adverse	Large adverse	Significant
AW_Theme_ID_1486867 (Head Barn Wood) AW	National	Operation only	Major adverse	Very large adverse	Significant
AW_Theme_ID_1486883 (Object ID 9151) AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID_1486891 (Between M2 carriageways) AW	National	Operation only	Major adverse	Large adverse	Significant
AW_Theme_ID_1486937 (Longhoes) AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID_1498304 AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
AW_Theme_ID_1498718 AW	National	Operation only	Major adverse	Very large adverse	Significant
AW_Theme_ID1420012 AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID1486951 AW	National	Operation only	Minor adverse	Moderate adverse	Significant
AW_Theme_ID1493831 AW	National	Operation only	Negligible adverse	Slight adverse	Not significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
AW_Theme_ID1494010 AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID1499144 AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID1499145 AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
AW_Theme_ID1499250 AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Barber's Wood AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
Bridge Woods AW	National	Operation only	Major adverse	Large adverse	Significant
CHADWELL WOOD (AW_Theme_ID 1119923) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Claylane Wood AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Codham Hall Wood AW	National	Construction and Operation	Major adverse	Large adverse	Significant
CONEYEARTH/PASCALLS/ HOLLOWS WOODS (AW_Theme_ID 1499437) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
DANE SHAW (AW_Theme_ID 1498350) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Epping-Ambresbury Banks AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Frith/Impton Woods AW	National	Operation only	Minor adverse	Slight adverse	Not significant
Great Crabbles Wood AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Great Wood AW	National	Operation only	Major adverse	Large adverse	Significant
Hall Wood AW	National	Operation only	Minor adverse	Slight adverse	Not significant
Hobbs Hole AW	National	Construction and Operation	Minor adverse	Slight adverse	Not significant
Impton/Podkin Wood AW	National	Operation only	Negligible adverse	Slight adverse	Not significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
Merrals Shaw (AW_Theme_ID 1486881) AW	National	Operation only	Moderate adverse	Large adverse	Significant
MILSTEAD/BASSILNE WOOD (AW_Theme_ID 1498502) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Mintching/Kingsdown Wood AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Peartree Wood AW	National	Construction and Operation	Moderate adverse	Moderate adverse	Significant
Putt Wood AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
REED'S SHAW (AW_Theme_ID 1498441) AW	National	Operation only	Moderate adverse	Moderate adverse	Significant
Shales More AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Shorne/Brewers Woods AW	National	Construction and Operation	Major adverse	Large adverse	Significant
The Osiers AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Upper Brooms Wood AW ((AW_Theme_ID_1498405 (Object ID 11581))	National	Operation only	Negligible adverse	Slight adverse	Not significant
WESTERHAM WOOD (AW_Theme_ID 1499087) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Yaugher Wood (AW_Theme_ID 1498451) AW	National	Operation only	Negligible adverse	Slight adverse	Not significant
Cobham Woods SSSI	National	Operation only	Major adverse	Large adverse	Significant
Epping Forest SSSI	National	Operation only	Negligible adverse	Slight adverse	Not significant
Great Crabbles Wood SSSI	National	Operation only	Negligible adverse	Slight adverse	Not significant
Halling To Trottiscliffe Escarpment SSSI	National	Operation only	Moderate adverse	Moderate adverse	Significant
Langdon Ridge SSSI	National	Operation only	No change	Neutral	Not significant
Shorne And Ashenbank Woods SSSI	National	Construction and Operation	Major adverse	Large adverse	Significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
Titsey Woods SSSI	National	Operation only	Negligible adverse	Slight adverse	Not significant
Westerham Wood SSSI	National	Operation only	Negligible adverse	Slight adverse	Not significant
Wouldham To Detling Escarpment SSSI	National	Operation only	Major adverse	Large adverse	Significant
Rede Common LNR	County	Operation only	Moderate adverse	Slight adverse	Not significant
All Saints Grassland LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Barber's Wood and Lane LWS	County	Operation only	Moderate adverse	Slight adverse	Not significant
Blue Bell Hill Banks and Verges LWS	County	Operation only	Moderate adverse	Slight adverse	Not significant
Bowers Gifford Grasslands LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Bridge Woods, Burham LWS	County	Operation only	Major adverse	Moderate adverse	Significant
Codham Hall Woods LWS	County	Construction and Operation	Major adverse	Moderate adverse	Significant
Copped Hall Green LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Court Wood, Shorne LWS	County	Construction and Operation	Moderate adverse	Slight adverse	Not significant
Cuxton Pit No. 3, Strood LWS	County	Operation only	Moderate adverse	Slight adverse	Not significant
Dartford Marshes LWS	County	Operation only	No change	Neutral	Not significant
Disused Railway Cutting, Longfield LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Frith Woods Etc., Kits Coty LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Goshems Farm LWS	County	Operation only	Minor adverse	Neutral	Not significant
Hall/Gravelhill Woods LWS	County	Operation only	Minor adverse	Neutral	Not significant
Hobbs Hole LWS	County	Construction and Operation	Minor adverse	Slight adverse	Not significant
Leybourne Lakes Etc., Snodland LWS	County	Operation only	No change	Neutral	Not significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
Linford Pit LWS	County	Operation only	Minor adverse	Neutral	Not significant
Low Street Pit LWS	County	Operation only	No change	Neutral	Not significant
Mucking Heath LWS	County	Operation only	Minor adverse	Neutral	Not significant
Nurstead And Cozendon Woods, Nash Street LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Parker's Shaw LWS	County	Operation only	Minor adverse	Neutral	Not significant
Rainbow Shaw LWS	County	Operation only	No change	Neutral	Not significant
River Medway And Marshes, Wouldham LWS	County	Operation only	No change	Neutral	Not significant
River Medway Between Cuxton and Temple Marsh LWS	County	Operation only	Minor adverse	Neutral	Not significant
Shales More LWS	County	Operation only	Negligible adverse	Neutral	Not significant
St Michael And All Angels Church LWS	County	Operation only	Moderate adverse	Slight adverse	Not significant
Terrels Heath Grays LWS	County	Operation only	Negligible adverse	Neutral	Not significant
The Oaks LWS	County	Operation only	No change	Neutral	Not significant
The Selvage LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Woodlands West of Shoreham LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Yaugher Woods LWS	County	Operation only	Negligible adverse	Neutral	Not significant
Broom Hill SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant
Buckingham Hill SINC	County	Operation only	Major adverse	Slight adverse	Not significant
Curtis Plantation SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant
Folkes Lane Woodland SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant
Foxburrow Wood, Upminster SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant

Site Name	Importance	Impact phase	Impact level	Effect	Significance
Franks Wood And Cranham Brickfields SINC	County	Operation only	Minor adverse	Neutral	Not significant
Hillview SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant
Ingrebourne Valley SINC	County	Operation only	Negligible adverse	Neutral	Not significant
Jermains Wood SINC	County	Operation only	Minor adverse	Neutral	Not significant
Lea Valley SINC	County	Operation only	No change	Neutral	Not significant
Little Chef Pasture SINC	County	Operation only	Minor adverse	Neutral	Not significant
Ockendon Railsides SINC	County	Construction and Operation	Major adverse	Moderate adverse	Significant
Pot Kiln Wood and Sickle Wood SINC	County	Operation only	Negligible adverse	Neutral	Not significant
River Shuttle SINC	County	Operation only	Negligible adverse	Neutral	Not significant
Romford To Harold Wood Railsides SINC	County	Operation only	Negligible adverse	Neutral	Not significant
Strawberry Farm Wood SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant
Thames Chase Forest Centre SINC	County	Construction and Operation	Major adverse	Slight adverse	Not significant
Tylers Wood SINC	County	Operation only	Minor adverse	Neutral	Not significant
Upminster Lodge Farm Horse Field SINC	County	Operation only	Moderate adverse	Slight adverse	Not significant

References

Achermann & Bobbink (2003). Expert Workshop on Empirical Critical Loads for Nitrogen Deposition on (Semi-)Natural Ecosystems: summary report / prepared by the organizers. [online] Available at: https://digitallibrary.un.org/record/498388?ln=en#record-files-collapse-header. [Accessed June 2022].

Balla, S., Uhl, R., Schlutow, A., Lorentz, H., Forster, M., Becker, C. 2013. Investigation and evaluation of road traffic-related nutrient inputs into sensitive biotopes.

Barnes, J.; Owens, N. 1998. Denitrification and nitrous oxide concentration in the Humber Estuary, UK, and adjacent coastal zones. Marine Pollution Bulletin 37: 247-260.

Bignal, K., Mike Ashmore, M., Power, S. 2004. The ecological effects of diffuse air pollution from road transport. English Nature Research Report No. 580. English Nature, Peterborough.

Bobbink, R., Hicks, K., Galloway, J., Spranger, T., Alkemade, R., Ashmore, M., Bustamante, M., Cinderby, S., Davidson, E., Dentener, F., Emmett, B., Erisman, J., Fenn, M., Gilliam, F., Nordin, A., Pardo, L., De Vries, W. 2010. Global assessment of nitrogen deposition effects on terrestrial plant diversity: A synthesis. Ecological Applications 20: 30-59.

Boorman, L. and Hazelden, J. 2012. Impacts of additional aerial inputs of nitrogen to salt marsh and transitional habitats. CCW Science Report No: 995, pp44, Countryside Council for Wales, Bangor, Wales.

Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1. http://www.ukhab.org/

Caporn, S., Field, C., Payne, R., Dise, N., Britton, A., Emmett, B., Jones, L., Phoenix, G., Power, S., Sheppard, L., Stevens, C. 2016. Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on seminatural habitats of conservation importance. Natural England Commissioned Reports, Number 210.

Centre for Ecology and Hydrology (CEH) 2022. Air Pollution Information System. Accessed May 2022. www.apis.ac.uk

Chartered Institute of Ecology and Environmental Management (CIEEM). 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

Chartered Institute of Ecology and Environmental Management (CIEEM). 2021. Advice on ecological assessment of air quality impacts. Chartered Institute of Ecology and Environmental Management, Winchester.

Clark, C., Bai, Y., Bowman, W., Cowles, J., Fenn, M., Gilliam, F., Phoenix, G., Siddique, I., Stevens, C., Sverdrup, H., Throop, H. 2013. Nitrogen deposition and terrestrial biodiversity. Encyclopedia of Biodiversity (Second Edition) pp. 519-536.

Defra. 2022. Annual emissions of nitrogen oxides in the UK: 1970 - 2020 - GOV.UK. [online] assets.publishing.service.gov.uk. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1054228/Figure06_NO_x_time_series.csv/preview [Accessed June 2022].

De Vries, W., Kros, H., Reinds, G.J., Bobbink, R., Smart, S. and Emmett, B. (2007). Developments in deriving critical limits and modelling critical loads of nitrogen for terrestrial ecosystems in Europe. Bilthoven: Alterra, Wageningen and CCE.

Dise, N., Ashmore, M., Belyazid, S., Bleeker, A., Bobbink, R., de Vries, W., Erisman, J., Spranger, T., Stevens, C., van den Berg, L. 2011. Nitrogen as a threat to European terrestrial biodiversity. In: Sutton, M., Howard, C., Erisman, J., Billen, G., Bleeker, A., Grennfelt, P., van Grinsven, H., Grizzetti, B. (eds.). The European Nitrogen Assessment. Cambridge University Press, Cambridge.

Emmett, B., Rowe, E., Stevens, C., Gowing, D., Henrys, P., Maskell, L., Smart, S. 2011. Interpretation of evidence of nitrogen impacts on vegetation in relation to UK biodiversity objectives. JNCC Report, No. 449, JNCC, Peterborough, ISSN 0963-8091.

European Commission,2000. Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission, pp.73.Grime, J. 1979. *Plant strategies and vegetation processes*. John Wiley, Chichester.

Grime, J. P. 2001. *Plant strategies, vegetation processes, and ecosystem properties*. Wiley, Chichester.

Grime, J., Thompson, K., Hunt, R., Hodgson, J., Cornelissen, J., Rorison, I., Hendry, G., Ashenden, T., Askew, A., Band, S., Booth, R., Bossard, C., Campbell, B., Cooper, J., Davison, A., Gupta, P., Hall, W., Hand, D., Hannah, M., Hillier, S., Hodkinson, D., Jalili, A., Liu, Z., Mackey, J.., Matthews, N., Mowforth, M., Neal, A., Reader, R., Reiling, K., Ross-Fraser, W., Spencer, R., Sutton, F., Tasker, D., Thorpe, P. and Whitehouse, J. 1997. Integrated screening validates primary axes of specialisation in plants. Oikos 79: 259-281.

Hall, J.; Curtis, C.; Dore, T.; Smith, R. 2015. Methods for the calculation of critical loads and their exceedances in the UK. Bangor, UK, NERC/Centre for Ecology & Hydrology, 108pp. (CEH Project no. C04913).

Highways England. 2019. *Design Manual for Roads and Bridges: LA 105 Air Quality.* https://standardsforhighways.co.uk/dmrb/search?q=LA%20105andpageNumber=1.

Highways England. 2020a. *Design Manual for Roads and Bridges: LA 104 Environmental Assessment and Monitoring.* https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true

Highways England. 2020b. *Design Manual for Roads and Bridges: LA 108 Biodiversity.* https://standardsforhighways.co.uk/dmrb/search?q=LA%20108andpageNumber=1.

Hill, M., Mountford J., Roy D., Bunce R. 1999. Ellenberg's indicator values for British plants. ECOFACT Volume 2, Technical Annex. ITE Monkswood, Huntingdon. London: Department of the Environment, Transport and the Regions.

Institute of Air Quality Management (IAQM) 2020. A guide to the assessment of air quality impacts on designated nature conservation sites, version 1.1. Institute of Air Quality Management, London

Joint Nature Conservation Committee. 2004. Common Standards Monitoring Guidance for Woodland Habitats. JNCC, Peterborough. https://data.jncc.gov.uk/data/6df1057b-5357-400b-a363-c8748298180a/CSM-WoodlandHabitats-2004.pdf

Jones, L.; Banin, L.; Bealey, B.; Field, C.; Caporn, S.; Payne, R.; Stevens, C.; Rowe, E.; Britton, A.; Mitchell, R.; Pakeman, R., Dise, N.; Robinson, E.; Tomlinson, S. 2018

Botanical benchmarks: application of single assessment site-based vegetation survey data in habitats regulations assessment for regulatory decision-making. Stirling, Scottish Environment Protection Agency (SEPA), 65pp. (SEPA Commissioned Report no. DK1605, CEH Project no. C06198) (Unpublished).

Kirby, K., Smart, S., Black, H., Bunce, R. Corney, P., Smithers, R. 2005. Long-term ecological change in British woodland (1971-2001). English Nature Research Report 653. English Nature, Peterborough.

Lake, S. (2015). Britain's Habitats: A Guide to the Wildlife Habitats of Britain and Ireland (WILDGuides). Princeton University Press.

Leith, I. van Dijk N., Pitcairn, C., Wolseley, P., Sutton, M. 2005. Refinement and testing of biomonitoring methods, and development of protocols, for assessing impacts of atmospheric nitrogen deposition or concentrations on statutory nature conservation sites. JNCC report. Peterborough. December 2005. 294 pp.

Maskell, S., Smart, S., Bullock, J., Thompson, J. and Stevens, C. 2010. Nitrogen deposition causes widespread loss of species richness in British habitats. Global Change Biology 16: 671-679.

McCollin, D, Crossley, C., Gilbert, J., Irving, A., Marjoram, J., McCall, J., McFadyen, S., Mohamud, A., Storey, E., Thompson-Poyser, T., Wood, D., 2017. The distribution of woodland flora in relation to edge effects: a UK woodland case study. Poster at IALE conference, June 2017. https://www.researchgate.net/publication/317903571_The_distribution_of_woodland_flora_in_relation_to_edge_effects_a_UK_woodland_case_study

Mitsch, W. and Gosselink, J. 2000. Wetlands. John Wiley & Sons. 752pp.

Multi-Agency Geographic Information for the Countryside (MAGIC). (2022). Available at: https://magic.defra.gov.uk/magicmap.aspx.

Natural England 2016. The ecological effects of air pollution from road transport: an updated review. Natural England Commissioned Report 199. Natural England, Peterborough. http://publications.naturalengland.org.uk/publication/6212190873845760

Panks, P., White, N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S., Heaver, M., Scott, S., Treweek, J., Butcher, B., and Stone, D. 2022. Biodiversity metric 3.1: Auditing and accounting for biodiversity – user guide. Natural England.

Pitcairn, C., Leith, I., Sheppard, L., Sutton, M., Fowler, D., Munro, R., Tang, S. and Wilson, D. 1998. The relationship between nitrogen deposition, species composition and foliar nitrogen concentrations in woodland flora in the vicinity of livestock farms. Environmental Pollution, 102: 41–48.

Pitcairn, C., Leith, I., Sheppard, L., and Sutton, M. (2006). Development of a nitrophobe/nitrophile classification for woodlands, grasslands and upland vegetation in Scotland. Centre for Ecology and Hydrology report for SEPA, Edinburgh.

RoTAP (2012) Review of Transboundary Air Pollution: Acidification, Eutrophication, Ground Level Ozone and Heavy Metals in the UK. Contract Report to the Department for Environment, Food and Rural Affairs. Centre for Ecology & Hydrology.

Spangenberg, A. and Kolling, C. 2004. Nitrogen deposition and nitrate leaching at forest edges exposed to high ammonia emissions in southern Bavaria. Water Air Soil Pollution 152: 233–255.

Stevens, C., Smart, S. Henrys, P., Maskell, L., Walker, K. Preston, C., Crowe, A., Rowe, E., Gowing, D., Emmett, B. 2011. Collation of evidence of nitrogen impacts on vegetation in relation to UK biodiversity objectives. JNCC Report, No. 447, JNCC, Peterborough, ISSN 0963-8091.

Sutton, M., Pitcairn, C., Whitfield, C., Leith, I., Sheppard, L., van Dijk, N., Tang, S., Skiba, U., Smart, S., Mitchell, R., Wolsley, P., James, P., Purvis, W., Fowler, D. 2004. Bioindicator and biomonitoring methods for assessing the effects of atmospheric nitrogen on statutory nature conservation sites. Peterborough, JNCC, 230pp. (JNCC Report, 356).

UKREATE (2007) Terrestrial Umbrella: Effects of Eutrophication and Acidification on Terrestrial Ecosystems CEH Contract Report. Defra Contract No. CPEA 18.

Figures

Annexes

A.1 All Saints Grassland LWS

A.1.1 Habitat parcel 1 transect 1

Latin Name	DAFOR	Ellenberg value
Understorey		
Crataegus monogyna	A	6
Fraxinus excelsior	O_LA	6
Ligustrum vulgare	A	5
Prunus domestica	R	6
Prunus spinosa	A	6
Rosa canina	R	6
Ulmus minor	O	7
Field layer		
Arrhenatherum elatius	R	7
Arum maculatum	O	7
Cirsium vulgare	R	6
Conium maculatum	O	8
Epilobium sp.	R	N/A
Hedera helix	D	6
Rubus fruticosus	F	6
Rumex sanguineus	R	7
Urtica dioica	O	8

A.1.2 No quadrat for hedgerow

A.1.3 Habitat parcel 2 transect 2

Latin Name	DAFOR	Ellenberg value
Field layer		
Agrimonia eupatoria	R	4
Agrostis capillaris	F	4
Alopecurus pratensis	O	7
Anthoxanthum odoratum	O in NNA, D in wider pasture	3
Arrhenatherum elatius	F	7
Centaurea nigra	O	5
Cerastium fontanum	R	4
Cirsium arvense	R	6
Cirsium vulgare	R	6
Convolvulus arvensis	R	6
Cynosurus cristatus	O	4
Dactylis glomerata	F	6
Daucus carota	O	8
Festuca arundinacea	R	6
Festuca rubra	O	5
Holcus lanatus	F	5
Hordeum secalinum	F	6
Lathyrus pratensis	R	5
Leucanthemum vulgare	R	4

Latin Name	DAFOR	Ellenberg value
Lolium perenne	F	6
Phleum pratense	R	6
Picris echioides	R	6
Potentilla reptans	R	5
Prunella vulgaris	R	4
Prunus spinosa (seedling and sapling)	O	6
Pulicaria dysenterica	R	4
Ranunculus acris	R	4
Rosa sp. (seedling)	R	N/A
Rumex sanguineus	R	7
Senecio jacobaea	R	4
Tragopogon pratensis	R	5
Trifolium pratense	R	5
Trisetum flavescens	R	4

A.1.4 Condition assessment: Habitat Parcel 1

Hedgerow criteria	Score	Comments
A1	Yes	
A2	Yes	
B1	No	
B2	Yes	
C1	Yes	
C2	Yes	
D1	Yes	
D1	Yes	
E1	Yes	
E2	Yes	
Total:	Good	

A.1.5 Condition assessment: Habitat parcel 2

Grassland criteria	Score	Comments
1	Yes	Herbs fairly frequent
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Moderate	

A.1.6 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
	
Former horse paddock but unmanaged for a number of years. Now rank and dominated by false oat grass.	Several ash stands at eastern end. No significant signs of ash dieback.
Photograph 3	**Photograph 4**
	
Hedgerow strimmed on the roadside.	Largely unmanaged hawthorn dominated hedge, with abundant wild privet and blackthorn.

A.2 AW THEME ID 1493831 AW

A.2.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	A-D	6
Quercus robur	O	4
Understorey		
Acer campestre	O-F	6
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus laevigata	O-F	5
Crataegus monogyna	F	6
Prunus spinosa	R	6

Latin Name	DAFOR	Ellenberg value
Field layer		
Agrostis stolonifera	A-D	6
Cirsium arvense	R	6
Cirsium vulgare	R	6
Lolium perenne	O	6
Oxalis acetosella	R	4
Ranunculus repens	R	7
Rubus fruticosus	O	6
Rumex sanguineus	O	7
Urtica dioica	O	8
Viola sp.	R	N/A

A.2.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	8	6
Quercus robur	4	4
Understorey		
Acer campestre	4	6
Cornus sanguinea	5	6
Corylus avellana	2	6
Crataegus laevigata	5	5
Crataegus monogyna	3	6
Prunus spinosa	3	6
Field layer		
Agrostis stolonifera	10	6
Rubus fruticosus	1	6
Rumex sanguineus	2	7
Urtica dioica	2	8

A.2.3 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	
2	1	Severe cattle grazing
3	3	
4	3	
5	3	
6	1	Very high *Agrostis* cover
7	1	
8	2	
9	2	
10	2	
11	1	
12	3	
13	1	
Total:	25 (Poor)	

A.2.4 Additional condition assessment notes: N/A

A.3 AW_ThemeID1486860 (Shorne Woods)

A.3.1 This site is Habitat parcel 1 of Shorne and Ashenbank Woods SSSI

A.3.2 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	F	6
Betula pendula	F	4
Fraxinus excelsior	O	6
Corylus avellana	R	6
Acer pseudoplatanus	O	6
Understorey		
Crataegus monogyna		6
Ilex aquifolium		5
Field layer		
Geum urbanum	O	7
Carex sylvatica	R	5
Hyacinthoides non-scripta	F	6
Arum maculatum	O	7
Dryopteris filix-mas	R	5
Lonicera periclymenum	R	5
Rubus fruticosus	F	6
Viola riviniana	O	4
Galium aparine	O	8
Epilobium sp	R	N/A
Poa annua	R	7
Agrostis stolonifera	R	6
Anemone nemorosa	R	4
Pteridium aquilinum	O	3
Dryopteris dilatata	R	5
Circaea lutetiana	O	6
Mercurialis perennis	O	7
Lysimachia nemorum	R	5
Lonicera periclymenum	O	5
Rumex sanguineus	O	7
Taraxacum agg	R	N/A
Hedera helix	LA	6
Veronica montana	O	6

Latin Name	DAFOR	Ellenberg value
Rhododendron sp	R	N/A
Pinus nigra	R	2
Brachypodium sylvaticum	R	5
Carex remota	R	6
Acer platanoides	R	7
Luzula forsteri	R	2
Fragaria vesca	R	4
Ajuga reptans	R	5
Ranunculus repens	R	7
Epilobium hirsutum	R	7
Dryopteris affinis	R	5

A.3.3 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Carpinus betulus	8	6
Betula pendula	2	4
Quercus robur	5	4
Fraxinus excelsior	1	6
Understorey		
Acer pseudoplatanus		6
Ilex aquifolium		5
Hyacinthoides non-scripta		6
Bare ground and leaf litter		N/A
Field		
Pteridium aquilinum		3
Rubus fruticosus		6
Hyacinthoides non-scripta		6
Mercurialis perennis		7
Dryopteris dilatata		5
Viola riviniana		4
Arum maculatum		7

A.3.4 Condition assessment: Habitat parcel 1 of Shorne and Ashenbank Wood SSSI

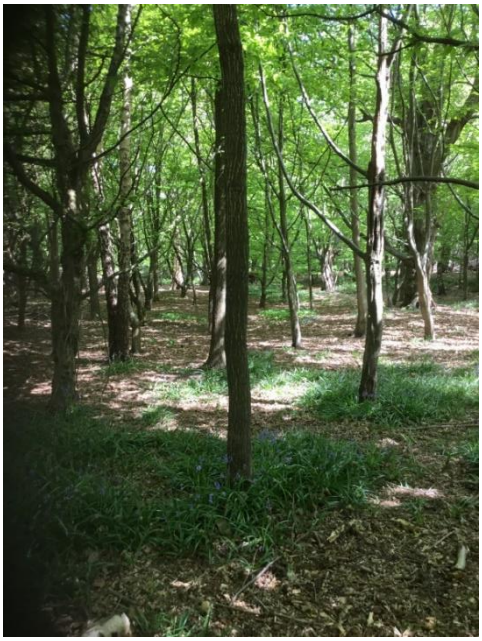
Woodland criteria	Score	Comments
1	2	
2	3	
3	1	

Woodland criteria	Score	Comments
4	3	
5	1	
6	1	
7	3	
8	3	
9	3	
10	2	
11	1	
12	1	
13	2	
Total:	27 (Moderate)	

A.3.5 Additional condition assessment notes: None

Photograph 1	**Photograph 2**
 Field layer showing the presence of INNS rhododendron (schedule 9)	 Ground layer showing the regular presence of deadwood among wood avens
Photograph 3	**Photograph 4**

Cleared path through the woodland



Bluebells among areas of bare ground with hornbeam and sweet chestnut canopy.

Photograph 5

Assemblage of ground flora including wild strawberry (AWI)

A.4 AW_Theme_ID_1486679 (Object ID 9096) AW (Cole Wood)

A.4.1 AW_Theme_ID_1486679 (Object ID 9096) AW (Cole Wood)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	R	5
Betula pendula	D	4
Fraxinus excelsior	R	6
Carpinus betulus	O	6
Corylus avellana	R	6

Latin Name	DAFOR	Ellenberg value
Quercus robur	R	4
Understorey		
Cornus sanguinea	R	6
Crataegus monogyna	R	6
Sambucus nigra	O	7
Ribes rubrum	O	6
Field layer		
Rubus fruticosus	A	6
Hyacinthoides non-scripta	A	6
Mercurialis perennis	F	7
Fraxinus excelsior	O	6
Tamus communis	R	6
Arum maculatum	R	7
Euphorbia amygdaloides	R	6
Circaea lutetiana	F	6
Viola riviniana	O	4
Veronica montana	O	6
Dryopteris dilatata	O	5
Lysimachia nemorum	R	5
Lonicera periclymenum	O	5
Lolium perenne	O	6
Hedera helix	F	6
Ranunculus ficaria	O	6
Anemone nemorosa	R	4
Geum urbanum	R	7
Geranium robertianum	R	6
Dryopteris filix-mas	R	5
Adoxa moschatellina	R	5
Poa sp	R	N/A
Rumex sanguineus	R	7
Stachys sylvatica	R	8
Carex pendula	R	6
Urtica dioica	O	8
Ajuga reptans	R	5
Carex sylvatica	R	5
Holcus mollis	LF	3
Galium aparine	R	8
Arctium lappa	R	9
Sonchus oleraceus	R	7
Fragaria vesca	R	4
Brachypodium sylvaticum	R	5
Anthriscus sylvestris	R	7
Stellaria holostea	R	6
Silene dioica	R	7
Heracleum sphondylium	R	7
Veronica hederifolia	R	6

Latin Name	DAFOR	Ellenberg value
Alliaria petiolata	R	8

A.4.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Sambucus nigra	3	7
Carpinus betulus	1	6
Understorey		
None recorded		
Field layer		
Hyacinthoides non-scripta	9	6
Rubus fruticosus	8	6
Circaea lutetiana	1	6
Dryopteris dilatata	1	5
Hedera helix	1	6
Lolium perenne	2	6
Sambucus nigra	1	7

A.4.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	Two age classes present: young and intermediate.
2	3	No signs.
3	3	
4	3	Diverse.
5	1	Dominated by sweet chestnut.
6	1	Little or no open space.
7	2	Some regeneration.
8	3	
9	3	AWI abundant.
10	2	Two storeys present.
11	1	
12	2	Deadwood quite frequent.
13	2	Some damage due to dumping.
Total:	28 (Moderate)	

A.4.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Dumping on woodland floor creating areas of damaged ground	 Tree guards indicating at least historic management

Photograph 3
 Open areas showing signs of good regeneration

A.5 Bluebell Hill LWS

A.5.1 Transect in Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Field layer		
Achillea millefolium	R	4
Agrimonia eupatoria	O	4

Latin Name	DAFOR	Ellenberg value
Anacamptis pyramidalis	O	3
Anthyllis vulneraria	R	2
Arrhenatherum elatius	O	7
Blackstonia perfoliata	O	2
Briza media	R	3
Carex flacca	F	2
Carlina vulgaris	R	2
Centaurium erythraea	R	3
Cerastium fontanum	R	4
Clematis vitalba	O	5
Cornus sanguinea	F	6
Crataegus monogyna	R	6
Crataegus monogyna	R	6
Dactylis glomerata	F	6
Dactylorhiza fuchsii	O	3
Daucus carota	O	8
Dipsacus fullonum	R	7
Euphrasia sp	O	N/A
Festuca rubra	O	5
Fraxinus excelsior	R	6
Galium mollugo	F	4
Hippocrepis comosa	R	2
Holcus lanatus	F	5
Hypericum perforatum	F	5
Hypochaeris radicata	O	3
Leucanthemum vulgare	O	4
Lotus corniculatus	O	2
Medicago lupulina	R	4
Orobanche sp	R	N/A
Picris hieracioides	F	3
Plantago lanceolata	F	4
Prunus spinosa	R	6
Rhinanthus minor	R	4
Rumex crispus	R	6
Scabiosa columbaria	R	2
Scrophularia nodosa	R	6
Senecio jacobaea	R	4
Sorbus aria	R	4
Trisetum flavescens	R	4
Urtica dioica	R	8

A.5.2 Quadrat in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Field layer		
Anacamptis pyramidalis	2	3
Blackstonia perfoliata	2	2
Brachypodium sylvaticum	4	5
Carex flacca	6	2
Cirsium acaule	1	3
Cornus sanguinea	7	6
Dactylorhiza fuchsii	2	3
Daucus carota	2	8
Euphrasia sp	1	N/A
Galium mollugo	3	4
Hypericum perforatum	2	5
Leucanthemum vulgare	4	4
Linum catharticum	2	2
Lotus corniculatus	3	2
Picris hieracioides	3	3
Plantago lanceolata	3	4
Prunella vulgaris	1	4
Senecio jacobaea	1	4
Viola hirta	1	2

A.5.3 Transect in Habitat parcel 2a

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	A	6
Acer pseudoplatanus	O	6
Betula pendula	R	4
Fraxinus excelsior	A	6
Prunus avium	R	6
Salix caprea	O	7
Sorbus aria	R	4
Sorbus intermedia	O	7
Ulmus procera	O	6
Understorey		
Ligustrum vulgare	O	5
Viburnum lantana	O	5
Field layer		
Acer campestre	R	6
Arum maculatum	R	7
Brachypodium sylvaticum	R	5

Latin Name	DAFOR	Ellenberg value
Fraxinus excelsior	R	6
Hedera helix	A	6
Iris foetidissima	R	5
Taxus baccata	R	5

A.5.4 Quadrat in Habitat parcel 2a

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	7	6
Acer pseudoplatanus	3	6
Betula pendula	1	4
Fraxinus excelsior	4	6
Salix caprea	2	7
Sorbus aria	1	4
Sorbus intermedia	3	7
Ulmus procera	4	6
Viburnum opulus	1	6
Understorey		
Corylus avellana	4	6
Ligustrum vulgare	3	5
Field layer		
Fraxinus excelsior	1	6
Hedera helix	8	6
Rubus fruticosus	1	6
Sorbus aria	1	4
Viburnum lantana	1	5

A.5.5 Transect in Habitat parcel 2b

Latin Name	DAFOR	Ellenberg value
Field layer		
Acer campestre	R	6
Achillea millefolium	R	4
Agrimonia eupatoria	R	4
Anacamptis pyramidalis	O	3
Arrhenatherum elatius	O	7
Carex flacca	O	2
Centaurea nigra	F	5
Cirsium arvense		6
Clematis vitalba	O	5
Cornus sanguinea	F	6
Fraxinus excelsior	R	6

Latin Name	DAFOR	Ellenberg value
Field layer		
Galium mollugo	F	4
Heracleum sphondylium	R	7
Holcus lanatus	O	5
Hypericum hirsutum	O	5
Leucanthemum vulgare	O	4
Melilotus officinalis	R	5
Origanum vulgare	A	4
Plantago lanceolata	R	4
Poa trivialis	R	6
Prunella vulgaris	R	4
Rumex crispus	R	6
Senecio jacobaea	R	4
Torilis japonica	R	7
Vicia cracca	R	5

A.5.6 Quadrat in Habitat parcel 2b

Latin Name	DOMIN	Ellenberg value
Field layer		
Centaurea nigra	3	6
Origanum vulgare	5	4
Arrhenatherum elatius	1	3
Anacamptis pyramidalis	2	7
Clematis vitalba	4	5
Agrimonia eupatoria	2	4
Leucanthemum vulgare	3	4
Fraxinus excelsior	1	4
Galium mollugo	4	6
Cornus sanguinea	6	6
Cirsium arvense	1	4
Torilis japonica	1	6

A.5.7 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	R	6
Carpinus betulus	O	6
Fagus sylvatica	O	5
Prunus avium	R	6
Understorey		

Acer campestre	F	6
Cornus sanguinea	O	6
Corylus avellana	A	6
Crataegus monogyna	O	6
Ligustrum vulgare	F	5
Malus sylvestris	R	6
Rosa sp.	R	N/A
Sorbus aria	O	4
Taxus baccata	O	5
Field layer		
Anacamptis pyramidalis	O	3
Blackstonia perfoliata	R	2
Brachypodium sylvaticum	O	5
Epipactis helleborine	O	4
Hedera helix	D	6
Hypericum perforatum	R	5
Inula conyzae	R	3
Iris foetidissima	O	5
Mercurialis perennis	R	7
Picris hieracioides	R	3
Rubus fruticosus	R	6
Viburnum lantana	O	5
Viburnum opulus	O	6
Viola hirta	R	2

A.5.8 Quadrat in Habitat parcel 3

Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Acer pseudoplatanus	1	6
Carpinus betulus	2	6
Fagus sylvatica	4	5
Prunus avium	1	6
Understorey		
Acer campestre	4	6
Cornus sanguinea	1	6
Corylus avellana	8	6
Crataegus monogyna	2	6
Ligustrum vulgare	4	5
Malus sylvestris	1	6
Rosa sp.	1	N/A
Sorbus aria	2	4
Taxus baccata	2	5
Field layer		

Epipactis helleborine	1	4
Fagus sylvatica	1	5
Hedera helix	10	6
Ligustrum vulgare	3	5

A.5.9 Transect in Habitat parcel 4

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Acer campestre	F	6
Acer pseudoplatanus	F	6
Betula pendula	F	4
Fraxinus excelsior	F	6
Prunus avium	F	6
Understorey		
Corylus avellana	F	6
Clematis vitalba	O	5
Cornus sanguinea	O	6
Crataegus monogyna	O	6
Ligustrum vulgare	O	5
Malus sp.	R	N/A
Sambucus nigra	R	7
Viburnum lantana	O	5
Viburnum opulus	R	6
Field layer		
Alliaria petiolata	R	8
Brachypodium sylvaticum	R	5
Clinopodium vulgare	R	4
Glechoma hederacea	R	7
Hedera helix	A	6
Hypericum perforatum	O	5
Iris foetidissima	O	5
Rubus fruticosus	O	6
Rumex sanguineus	O	7

A.5.10 Quadrat in Habitat parcel 4

Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Acer campestre	7	6
Acer pseudoplatanus	5	6
Betula pendula	1	4
Fraxinus excelsior	6	6
Prunus avium	2	6

Understorey		
Clematis vitalba	3	5
Cornus sanguinea	4	6
Corylus avellana	3	6
Crataegus monogyna	1	6
Ligustrum vulgare	1	5
Malus sp.	2	N/A
Sambucus nigra	1	7
Viburnum lantana	1	5
Viburnum opulus	2	6
Field layer		
Acer pseudoplatanus	2	6
Fraxinus excelsior	1	6
Hedera helix	8	6
Prunus avium	1	6
Rosa sp.	1	N/A
Rubus fruticosus	3	6

A.5.11 Transect in Habitat parcel 5

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Acer pseudoplatanus	F	6
Fagus sylvatica	O	5
Fraxinus excelsior	F	6
Understorey		
Acer campestre	F	6
Betula pendula	O	4
Clematis vitalba	O	5
Cornus sanguinea	F	6
Ilex aquifolium	R	5
Ligustrum vulgare	F	5
Prunus spinosa	O	6
Rosa canina	O	6
Viburnum lantana	O	5
Field layer		
Alliaria petiolata	R	8
Arum maculatum	R	7
Hedera helix	A	6
Rubus fruticosus	O	6
Urtica dioica	R	8

A.5.12 Quadrat in Habitat parcel 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	9	6
Fraxinus excelsior	4	6
Understorey		
Acer campestre	4	6
Cornus sanguinea	2	6
Prunus avium	3	6
Sambucus nigra	1	7
Viburnum lantana	2	5
Field layer		
Acer pseudoplatanus	2	6
Fraxinus excelsior	2	6
Hedera helix	10	6
Iris foetidissima	1	5

A.5.13 Transect in Habitat parcel 6

Latin Name	DAFOR	Ellenberg value
Field layer		
Anacamptis pyramidalis	O	3
Arrhenatherum elatius	O	7
Artemisia vulgaris	R	7
Brachypodium sylvaticum	R	5
Calystegia sepium	O	7
Centaurea nigra	O	5
Cirsium arvense	R	6
Clematis vitalba	F	5
Cornus sanguinea	A	6
Dactylis glomerata	O	6
Eupatorium cannabinum	R	7
Fraxinus excelsior (seedlings and young trees)	R	6
Galium mollugo	F	4
Heracleum sphondylium	R	7
Holcus lanatus	O	5
Hypericum perforatum	F	5
Lathyrus latifolius	O	3
Leucanthemum vulgare	R	4
Origanum vulgare	O	4
Prunus spinosa	O	6

Latin Name	DAFOR	Ellenberg value
Rubus fruticosus	O	6
Rumex crispus	R	6
Torilis japonica	R	7
Viburnum lantana	O	5

A.5.14 Quadrat in Habitat parcel 6

Latin Name	DOMIN	Ellenberg value
Field layer		
Acer campestre	1	6
Anacamptis pyramidalis	1	3
Calystegia sepium	1	7
Cornus sanguinea	6	6
Galium mollugo	4	4
Hedera helix	7	6
Hypericum perforatum	3	5
Lathyrus latifolius	5	3
Origanum vulgare	3	4
Potentilla reptans	3	5
Prunus avium	1	6
Prunus spinosa	4	6
Rubus fruticosus	2	6
Rumex crispus	1	6

A.5.15 Transect in Habitat parcel 7: viewed from road, no transect

A.5.16 Quadrat in Habitat parcel 7: viewed from road, no quadrat

A.5.17 Transect in Habitat parcel 8

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	F	6
Fagus sylvatica	F	5
Fraxinus excelsior	F	6
Taxus baccata	O	5
Understorey		
Ligustrum vulgare	F	5
Corylus avellana	F	6
Field layer		
Acer campestre (seedling)	F	6
Anacamptis pyramidalis	R	3
Brachypodium sylvaticum	F	5

Latin Name	DAFOR	Ellenberg value
Carpinus betulus	R	6
Clematis vitalba	R	5
Cornus sanguinea	O	6
Crataegus monogyna (seedling)	O	6
Dactylorhiza fuchsii	R	3
Daphne laureola	R	5
Epipactis helleborine	F	4
Festuca rubra	R	5
Fraxinus excelsior (seedling)	F	6
Hedera helix	A	6
Hypericum perforatum	R	5
Ilex aquifolium	O	5
Prunus avium	R	6
Prunus spinosa (seedling)	O	6
Quercus robur (seedling)	R	4
Rosa canina	R	6
Rumex sanguineus	R	7
Sanicula europaea	O	5
Tamus communis	R	6
Taxus baccata	O	5
Urtica dioica	R	8
Veronica chamaedrys	R	5
Viburnum lantana	O	5

A.5.18 Quadrat in Habitat parcel 8

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	4	6
Acer pseudoplatanus	1	6
Crataegus monogyna	1	6
Fagus sylvatica	4	5
Fraxinus excelsior	4	6
Prunus avium	1	6
Taxus baccata	1	5
Understorey		
Cornus sanguinea	3	6
Corylus avellana	7	6
Ligustrum vulgare	2	5
Taxus baccata	2	5
Viburnum lantana	4	5
Field layer		
Acer campestre	1	6

Acer pseudoplatanus	2	6
Brachypodium sylvaticum	2	5
Corylus avellana	2	6
Crataegus monogyna	2	6
Epipactis helleborine	3	4
Fagus sylvatica	1	5
Fragaria vesca	1	4
Fraxinus excelsior	2	6
Hedera helix	9	6
Heracleum sphondylium	3	7
Ligustrum vulgare	2	5
Prunus spinosa	1	6
Quercus robur	1	4
Rosa canina	1	6
Viburnum lantana	4	5

A.5.19 Transect in Habitat parcel 9

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Achillea millefolium	O	4
Anthyllis vulneraria	R	2
Arrhenatherum elatius	R	7
Blackstonia perfoliata	O	2
Brachypodium sylvaticum	O	5
Bromopsis erecta	F	3
Carex flacca	F	2
Carlina vulgaris	R	2
Centaurea nigra	O	5
Centaurea scabiosa	R	3
Clematis vitalba	O	5
Dactylis glomerata	O	6
Dactylorhiza fuchsii	R	3
Epipactis helleborine	R	4
Fragaria vesca	R	4
Galium mollugo	F	4
Holcus lanatus	R	5
Hypericum perforatum	F	5
Lathyrus latifolius	O	3
Lathyrus pratensis	R	5
Leucanthemum vulgare	O	4
Medicago lupulina	R	4
Onobrychis viciifolia	O	3
Origanum vulgare	F	4

Pilosella officinarum	R	2
Plantago lanceolata	O	4
Poa trivialis	R	6
Polygala vulgaris	R	3
Prunella vulgaris	R	4
Rosa canina	R	6
Rubus fruticosus	O	6
Scabiosa columbaria	O	2
Senecio jacobaea	O	4
Silene vulgaris	R	5
Taraxacum officinale agg.	O	6
Teucrium scorodonia	R	3
Trifolium pratense	R	5
Viburnum lantana	O	5
Viola hirta	R	2

A.5.20 Quadrat in Habitat parcel 9

Latin Name	DOMIN	Ellenberg value
Field layer		
Achillea millefolium	4	4
Agrimonia eupatoria	1	4
Anthyllis vulneraria	1	2
Betula pendula	1	4
Brachypodium sylvaticum	4	5
Bromopsis erecta	4	3
Carex flacca	4	2
Centaurea nigra	3	5
Cornus sanguinea	3	6
Fragaria vesca	1	4
Galium mollugo	3	4
Hippocrepis comosa	1	2
Leontodon autumnalis	4	4
Leucanthemum vulgare	3	4
Medicago lupulina	1	4
Onobrychis viciifolia	4	3
Origanum vulgare	2	4
Pilosella officinarum	1	2
Polygala vulgaris	1	3
Prunus spinosa	1	6
Quercus robur	1	4
Rosa canina	2	6
Sanguisorba minor	4	3
Scabiosa columbaria	1	2

Latin Name	DOMIN	Ellenberg value
Field layer		
Trifolium pratense	1	5
Viola hirta	1	2

A.5.21 Transect in Habitat parcel 10

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Fagus sylvatica	O	5
Prunus avium	O	6
Understorey		
Betula pendula	F	4
Clematis vitalba	O	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Ligustrum vulgare	O	5
Sambucus nigra	R	7
Taxus baccata	F	5
Viburnum lantana	O	5
Field layer		
Alliaria petiolata	R	8
Brachypodium sylvaticum	O	5
Bromopsis ramosa	R	7
Cotoneaster horizontalis	F	4
Daphne laureola	F	5
Euphorbia amygdaloides	R	6
Geranium robertianum	O	6
Hedera helix	F	6
Iris foetidissima	R	5
Lamiastrum galeobdolon	R	6
Lapsana communis	R	7
Melica uniflora	O	5
Rubus fruticosus	O	6
Sanicula europaea	R	5
Teucrium scorodonia	O	3
Viola sp.	R	N/A

A.5.22 Quadrat in Habitat parcel 10

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	5	6

Betula pendula	4	4
Fagus sylvatica	4	5
Prunus avium	4	6
Taxus baccata	6	5
Understorey		
Clematis vitalba	2	5
Cornus sanguinea	2	6
Corylus avellana	3	6
Crataegus monogyna	1	6
Daphne laureola	2	5
Ligustrum vulgare	2	5
Sambucus nigra	1	7
Sorbus aria	1	4
Viburnum lantana	2	5
Field layer		
Hedera helix	3	6
Bare ground	9	#N/A

A.5.23 Transect in Habitat parcel 11

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Acer pseudoplatanus	F	6
Fraxinus excelsior	F	6
Understorey		
Acer campestre	O	6
Buddleja davidii	O	5
Cornus sanguinea	F	6
Crataegus monogyna	A	6
Ilex aquifolium	R	5
Ligustrum vulgare	A	5
Prunus spinosa	F	6
Rhamnus cathartica	R	6
Rosa canina	R	6
Viburnum lantana	A	5
Field layer		
Acer campestre	O	6
Acer pseudoplatanus	O	6
Anchusa arvensis	R	5
Arum maculatum	F	7
Cirsium arvense	R	6
Cirsium vulgare	R	6
Clematis vitalba	F	5
Fraxinus excelsior	O	6

Latin Name	DAFOR	Ellenberg value
Hedera helix	D	6
Helleborus foetidus	F	3
Hypericum perforatum	R	5
Iris foetidissima	R	5
Origanum vulgare	R	4
Reseda lutea	R	5
Rubus fruticosus	R	6
Solanum dulcamara	R	7
Sonchus arvensis	R	6
Tamus communis	O	6
Urtica dioica	R	8

A.5.24 Quadrat in Habitat parcel 11

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	5	6
Fraxinus excelsior	6	6
Understorey		
Acer campestre	2	6
Cornus sanguinea	4	6
Crataegus monogyna	5	6
Ligustrum vulgare	3	5
Prunus spinosa	1	6
Viburnum lantana	4	5
Field layer		
Acer campestre	1	6
Hedera helix	9	6
Tamus communis	3	6

A.5.25 Transect in Habitat parcel 12

Latin Name	DAFOR	Ellenberg value
Field layer		
Achillea millefolium	F	4
Anacamptis pyramidalis	R	3
Arrhenatherum elatius	F	7
Artemisia vulgaris	O	7
Blackstonia perfoliata	R	2
Brachypodium sylvaticum	F	5
Briza media	R	3
Carex flacca	R	2
Carlina vulgaris	R	2

Latin Name	DAFOR	Ellenberg value
Centaurea nigra	F	5
Centaurium erythraea	R	3
Cichorium intybus	R	5
Clematis vitalba	R	5
Clinopodium vulgare	O	4
Crocosmia x crocosmiiflora	R	4
Dactylis glomerata	F	6
Daucus carota	O	8
Dipsacus fullonum	O	7
Echium vulgare	F	4
Elytrigia repens	R	7
Epipactis helleborine	R	4
Erigeron acer	R	3
Festuca rubra	R	5
Foeniculum vulgare	O	5
Galium mollugo	O	4
Glechoma hederacea	R	7
Hypericum sp.	R	N/A
Hypochaeris radicata	R	3
Leucanthemum vulgare	O	4
Lolium perenne	F	6
Lotus corniculatus	F	2
Malva sylvestris	F	7
Melilotus albus	R	4
Melilotus indicus	R	N/A
Onobrychis viciifolia	O	3
Origanum vulgare	O	4
Pastinaca sativa	O	5
Picris echioides	R	6
Plantago coronopus	F	4
Plantago lanceolata	O	4
Potentilla reptans	O	5
Sanguisorba minor	O	3
Senecio jacobaea	R	4
Stellaria graminea	R	4
Taraxacum officinale agg.	R	6
Teucrium scorodonia	O	3
Tragopogon pratensis	R	5
Trifolium pratense	R	5
Vicia sativa	O	4
Viola hirta	R	2

A.5.26 Quadrat in Habitat parcel 12

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Fagus sylvatica	4	5
Fraxinus excelsior	4	6
Quercus sp.	1	N/A
Sorbus aria	1	4
Understorey		
Acer campestre	4	6
Betula pendula	1	4
Buddleja davidii	2	5
Clematis vitalba	4	5
Cornus sanguinea	4	6
Corylus avellana	5	6
Ligustrum vulgare	4	6
Prunus avium	1	5
Prunus spinosa	3	6
Rosa canina	1	6
Sambucus nigra	1	7
Taxus baccata	1	5
Viburnum lantana	5	5
Field layer		
Acer campestre	1	6
Brachypodium sylvaticum	3	5
Cornus sanguinea	2	6
Crataegus monogyna	1	6
Fragaria vesca	1	4
Fraxinus excelsior	1	6
Hedera helix	4	6
Iris foetidissima	1	5
Ligustrum vulgare	3	5
Rubus fruticosus	2	6
Thuidium tamariscinum	6	N/A
Veronica chamaedrys	1	5
Viburnum lantana	2	5

A.5.27 Transect in Habitat parcel 13

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Fagus sylvatica	O	5
Fraxinus excelsior	F	6
Quercus petraea	R	4

Latin Name	DAFOR	Ellenberg value
Sorbus aria	O	4
Understorey		
Acer campestre	F	6
Betula pendula	F	4
Buddleja davidii	O	5
Clematis vitalba	F	5
Cornus sanguinea	F	6
Corylus avellana	F	6
Viburnum opulus	O	6
Crataegus monogyna	F	6
Euonymus europaeus	O	5
Ligustrum vulgare	F	5
Lonicera nitida	R	N/A
Prunus avium	O	6
Prunus spinosa	R	6
Rosa canina	O	6
Sambucus nigra	R	7
Taxus baccata	F	5
Viburnum lantana	F	5
Field layer		
Anacamptis pyramidalis	O	3
Brachypodium sylvaticum	F	5
Campanula trachelium	R	6
Carex flacca	O	2
Castanea sativa	R	5
Chaerophyllum temulum	O	7
Cotoneaster bullatus	R	4
Cotoneaster horizontalis	F	4
Cupressus sp.	R	N/A
Dactylorhiza fuchsii	R	3
Dryopteris filix-mas	O	5
Epipactis helleborine	F	4
Fragaria vesca	O	4
Galium mollugo	O	4
Geranium robertianum	O	6
Hedera helix	F	6
Hypericum sp.	O	N/A
Ilex aquifolium	O	5
Iris foetidissima	O	5
Larix sp.	R	N/A
Mercurialis perennis	O	7
Prunus laurocerasus	O	6
Rubus fruticosus	F	6
Stachys sylvatica	O	8

Latin Name	DAFOR	Ellenberg value
Tamus communis	O	6
Torilis japonica	O	7
Veronica chamaedrys	O	5

A.5.28 Quadrat in Habitat parcel 13

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Fagus sylvatica	4	5
Fraxinus excelsior	4	6
Quercus sp.	1	N/A
Sorbus aria	1	4
Understorey		
Acer campestre	4	6
Betula pendula	1	4
Buddleja davidii	2	5
Clematis vitalba	4	5
Cornus sanguinea	4	6
Corylus avellana	5	6
Ligustrum vulgare	4	5
Prunus avium	1	6
Prunus spinosa	3	6
Rosa canina	1	6
Sambucus nigra	1	7
Taxus baccata	1	5
Viburnum lantana	5	5
Field layer		
Brachypodium sylvaticum	2	5
Cornus sanguinea	1	6
Cotoneaster horizontalis	2	4
Crataegus monogyna	1	6
Fragaria vesca	4	4
Fraxinus excelsior	1	6
Galium mollugo	2	4
Geranium robertianum	1	6
Hedera helix	8	6
Hypericum hirsutum	1	5
Ilex aquifolium	1	5
Ligustrum vulgare	3	5
Lonicera periclymenum	1	5
Rubus fruticosus	1	6
Tamus communis	2	6

Latin Name	DOMIN	Ellenberg value
Thuidium tamariscinum	4	N/A
Viburnum lantana	3	5

A.5.29 Transect in Habitat parcel 13 (east)

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Fraxinus excelsior	F	6
Understorey		
Acer campestre	O	6
Clematis vitalba	O	5
Cornus sanguinea	O	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Ilex aquifolium	O	5
Ligustrum vulgare	F	5
Rosa canina	O	6
Taxus baccata	F	5
Field layer		
Dryopteris filix-mas	O	5
Glechoma hederacea	R	7
Hedera helix	A	6
Mercurialis perennis	O	7
Prunus laurocerasus	R	6
Rubus fruticosus	O	6
Tamus communis	R	6

A.5.30 Quadrat in Habitat parcel 13 (east)

Latin Name	DOMIN	Ellenberg value
Field		
Anisantha sterilis	2	7
Anthriscus sylvestris	1	7
Arrhenatherum elatius	3	7
Artemisia vulgaris	2	7
Dactylis glomerata	5	6
Echium vulgare	5	4
Elytrigia repens	2	7
Linaria vulgaris	1	6
Lolium perenne	4	6
Malva sp.	1	N/A
Picris echioides	1	6
Plantago coronopus	3	4

Latin Name	DOMIN	Ellenberg value
Rubus fruticosus	1	6
Sedum acre	4	2
Taraxacum officinale agg.	1	6

A.5.31 Condition assessment: Habitat parcel 1

Grassland criteria	Score	Comments
1	Yes	
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Good	

A.5.32 Condition assessment: Habitat parcel 2a

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	3	
6	1	
7	2	
8	3	
9	1	
10	1	
11	1	
12	1	
13	3	
Total:	27 (Moderate)	

A.5.33 Condition assessment: Habitat parcel 2b

Grassland criteria	Score	Comments
1	No	Very few grass species
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Moderate	

A.5.34 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	3	
6	1	
7	2	Heavy shading restricting regeneration
8	3	
9	2	
10	1	Most often only one storey
11	1	
12	1	
13	3	
Total:	28 (Moderate)	

A.5.35 Condition assessment: Habitat parcel 4

Woodland criteria	Score	Comments
1	1	
2	3	
3	3	
4	3	
5	1	
6	1	No open space
7	2	Seedlings present
8	2	Ash dieback present
9	1	
10	1	Most often one storey
11	1	
12	1	
13	1	
Total:	(21) Poor	

A.5.36 Condition assessment: Habitat parcel 5

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	1	
6	1	
7	3	
8	2	Ash dieback
9	2	Looks to be W8
10	2	
11	1	
12	2	
13	2	Some damage from fly tipping

Woodland criteria	Score	Comments
Total:	27 (Moderate)	

A.5.37 Condition assessment: Habitat parcel 6

Grassland criteria	Score	Comments
1	No	
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Moderate	

A.5.38 Condition assessment: Habitat parcel 7

Hedgerow criteria	Score	Comments
A1	Yes	
A2	Yes	
B1	Yes	
B2	Yes	
C1	No	
C2	Yes	
D1	No	Sycamore frequent
D2	Yes	
E1	Yes	
E2	Yes	
Total:	Good	

A.5.39 Condition assessment: Habitat parcel 8

Woodland criteria	Score	Comments
1	2	
2	3	
3	1	Only three seedlings of laurel found
4	3	
5	3	
6	1	
7	2	
8	2	
9	3	
10	2	
11	1	
12	1	
13	3	
Total:	27 (Moderate)	

A.5.40 Condition assessment: Habitat parcel 9

Grassland criteria	Score	Comments
1	Yes	
2	Yes	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Good	

A.5.41 Condition assessment: Habitat parcel 10

Woodland criteria	Score	Comments
1	2	No trees over 150 years
2	3	
3	2	Small amount of cotoneaster horizontalis and variegated yellow archangel
4	3	
5	3	
6	3	One open area on cliff side probably about 10%
7	2	
8	3	
9	3	
10	2	
11	2	
12	3	
13	No score entered for criterion	
Total:	31 (Moderate)	

A.5.42 Condition assessment: Habitat parcel 11

Scrub criteria	Score	Comments
1	Yes	
2	Yes	
3	Yes	
4	No	
5	No	
Total:	Moderate	

A.5.43 Condition assessment: Habitat parcel 12

Grassland criteria	Score	Comments
1	Yes	
2	No	Difficult to judge as sward very open and has died back in the heat
3	Yes	
4	Yes	

Grassland criteria	Score	Comments
5	Yes	A tiny amount of montbretia recorded but nothing else
6	Yes	
Total:	Good	

A.5.44 Condition assessment: Habitat parcel 13

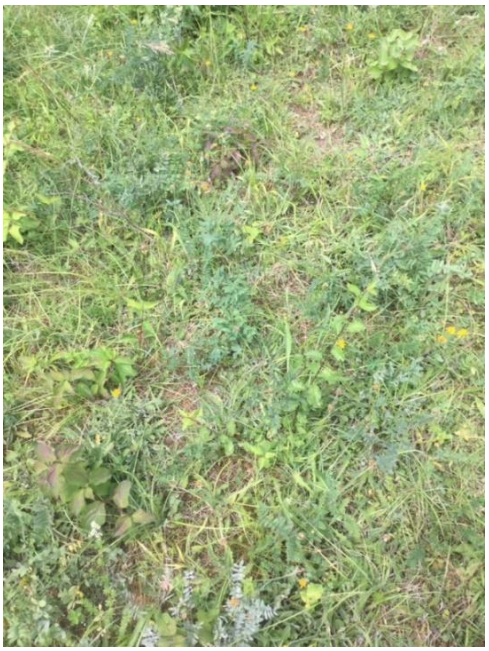
Woodland criteria	Score	Comments
1	2	No trees over 150 years
2	3	
3	1	
4	3	
5	3	
6	1	No open space
7	3	
8	2	Ash dieback present
9	2	W8 woodland
10	2	
11	1	
12	1	
13	3	
Total:	27 (Moderate)	

A.5.45 Additional condition assessment notes: None

A.5.46 Habitat parcel 13: Had two transects, one of which was on a steep cliff, of which only the footpath was accessible.

Photograph 1	Photograph 2
 Possible reptile hibernacula from discarded mowings	

	Semi mature stands starting to create a shaded canopy
Photograph 3	**Photograph 4**
	
Vetch sp. Among other grasses	Area of dense dogwood regeneration
Photograph 5	**Photograph 6**
	
Ground flora dominated by ivy with wayfaring tree regeneration	Scrub encroachment from woodland into nearby grassland
Photograph 7	**Photograph 8**

 Grassland with dogwood seedlings from encroaching scrub	 Grassland with dogwood seedings from encroaching scrub
Photograph 9	**Photograph 10**
 Ground layer of woodland dominated by ivy	 Canopy becoming dense in areas

A.6 Bridge Wood AW

A.6.1 Transect in Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Fraxinus excelsior	F	6

Latin Name	DAFOR	Ellenberg value
Betula pendula	R	4
Prunus avium	O	6
Quercus robur	R	4
Understorey		
Carpinus betulus	O	6
Rubus fruticosus agg	F	6
Corylus avellana	O	6
Cornus sanguinea	R	6
Crataegus laevigata	O	5
Acer campestre	O	6
Taxus baccata	O	5
Buddleja davidii	R	5
Ilex aquifolium	O	5
Acer platanoides	R	7
Crataegus monogyna	R	6
Prunus laurocerasus	R	6
Acer pseudoplatanus	R	6
Field layer		
Pteridium aquilinum	R	3
Carex sylvatica	O	5
Rumex sanguineus	F	7
Prunella vulgaris	O	4
Fragaria vesca	O	4
Anemone nemorosa	F	4
Lamiastrum galeobdolon	R	6
Lonicera periclymenum	F	5
Veronica montana	R	6
Geum urbanum	F	7
Circaea lutetiana	F	6
Poa trivialis	O	6
Potentilla sterilis	R	5
Viola sp.	F	N/A
Fraxinus excelsior	F	6
Hyacinthoides non-scripta	R	6
Primula vulgaris	R	4
Poa nemoralis	R	5
Euphorbia amygdaloides	O	6
Veronica sp.	R	N/A
Geranium robertianum	R	6
Dryopteris dilatata	R	5
Luzula sp.	R	N/A
Veronica officinalis	R	4
Anthoxanthum odoratum	R	3
Sorbus aucuparia	R	4
Carex remota	R	6
Stachys sylvatica	R	8

A.6.2 Quadrat in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	8	5
Fraxinus excelsior	4	6
Quercus robur	1	4
Understorey		
Crataegus laevigata	2	5
Ilex aquifolium	2	5
Carpinus betulus	3	6
Taxus baccata	2	5
Prunus laurocerasus	1	6
Corylus avellana	3	6
Acer campestre	3	6
Acer platanoides	1	7
Sambucus nigra	2	7
Crataegus monogyna	2	6
Lonicera periclymenum	3	5
Field layer		
Anemone nemorosa	4	4
Hyacinthoides non-scripta	2	6
Castanea sativa	5	5
Rumex sanguineus	1	7
Carex sylvatica	1	5
Fraxinus excelsior	3	6
Carpinus betulus	2	6
Bare ground	8	N/A

A.6.3 Transect in Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Fraxinus excelsior	O	6
Salix caprea	R	7
Betula pendula	R	4
Quercus robur	R	4
Understorey		
Carpinus betulus	F	6
Daphne laureola	O	5
Rubus fruticosus	A	6

Latin Name	DAFOR	Ellenberg value
Viburnum lantana	O	5
Acer campestre	R	6
Taxus baccata	R	5
Corylus avellana	O	6
Crataegus laevigata	O	5
Acer platanoides	R	7
Cornus sanguinea	R	6
Acer pseudoplatanus	R	6
Ligustrum vulgare	R	5
Field layer		
Iris foetidissima	O	5
Arum maculatum	O	7
Geum urbanum	F	7
Viola sp.	O	N/A
Circaea lutetiana	F	6
Fragaria vesca	O	4
Poa trivialis	O	6
Potentilla sterilis	R	5
Lysimachia nemorum	R	5
Anemone nemorosa	R	4
Primula vulgaris	O	4
Rumex sanguineus	F	7
Lamiastrum galeobdolon ssp montanum	O	N/A
Euphorbia amygdaloides	O	6
Hyacinthoides non-scripta	R	6
Dryopteris dilatata	O	5
Dryopteris filix-mas	O	5
Lonicera periclymenum	R	5
Epilobium ciliatum	R	6
Milium effusum	R	5
Carex sylvatica	O	5
Ajuga reptans	R	5
Ilex aquifolium	R	5
Rosa canina	R	6

A.6.4 Quadrat in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Fraxinus excelsior	4	6
Betula pendula	1	4
Quercus robur	2	4
Taxus baccata	2	5
Understorey		

Latin Name	DOMIN	Ellenberg value
Carpinus betulus	4	6
Corylus avellana	3	6
Viburnum lantana	3	5
Crataegus laevigata	4	5
Rubus fruticosus	5	6
Daphne laureola	3	5
Cornus sanguinea	2	6
Crataegus monogyna	2	6
Salix caprea	3	7
Rosa sp.	1	
Ilex aquifolium	1	5
Field layer		
Rubus fruticosus	7	6
Rumex sanguineus	3	7
Poa trivialis	1	6
Fragaria vesca	1	4
Lamiastrum galeobdolon	4	6
Fraxinus excelsior	4	6
Geum urbanum	2	7
Viburnum lantana	1	5
Arum maculatum	1	7
Castanea sativa	1	5
Crataegus monogyna	1	6
Primula vulgaris	1	4
Lonicera periclymenum	1	5
Viola sp.	2	N/A
Bare ground	6	N/A

A.6.5 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	F	6
Acer platanoides	R	7
Fraxinus excelsior	F	6
Betula pendula	R	4
Castanea sativa	A	5
Quercus robur	R	4
Acer pseudoplatanus	R	6
Fagus sylvatica	R	5
Prunus avium	R	6
Understorey		
Acer campestre	O	6
Cornus sanguinea	R	6
Daphne laureola	R	5
Corylus avellana	O	6

Latin Name	DAFOR	Ellenberg value
Crataegus x media	R	N/A
Rubus fruticosus	F	6
Ilex aquifolium	R	5
Sambucus nigra	R	7
Ligustrum vulgare	R	5
Taxus baccata	R	
Field layer		
Fraxinus excelsior	O	6
Arum maculatum	O	7
Viola sp.	O	N/A
Hyacinthoides non-scripta	O	6
Primula vulgaris	R	4
Mercurialis perennis	F	7
Euphorbia amygdaloides	R	6
Clematis vitalba	R	5
Iris foetidissima	R	5
Circaea lutetiana	O	6
Pteridium aquilinum	R	3
Dryopteris filix-mas	R	5
Poa trivialis	O	6
Urtica dioica	R	8
Dryopteris dilatata	R	5
Lonicera periclymenum	O	5
Anemone nemorosa	O	4
Hedera helix	F	6
Atrichum undulatum	R	N/A
Bare ground	A	N/A

A.6.6 Quadrat in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	6	5
Fraxinus excelsior	5	6
Betula pendula	1	4
Understorey		
Carpinus betulus	7	6
Crataegus sp.	4	N/A
Ilex aquifolium	1	5
Field layer		
Hyacinthoides non-scripta	5	6
Acer campestre	1	6
Bare ground	8	N/A

A.6.7 Transect in Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	F	5
Carpinus betulus	F	6
Quercus robur	O	4
Fraxinus excelsior	O	6
Fagus sylvatica	O	5
Prunus avium	O	6
Understorey		
Cupressus sp.	O	N/A
Acer pseudoplatanus	F	6
Cornus sanguinea	O	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Euonymus europaeus	R	5
Ilex aquifolium	O	5
Lonicera periclymenum	O	5
Sambucus nigra	R	7
Field layer		
Arum maculatum	R	7
Betula pendula	O	4
Circaea lutetiana	F	6
Dryopteris dilatata	F	5
Dryopteris filix-mas	F	5
Epilobium montanum	O	6
Euphorbia amygdaloides	O	6
Fraxinus excelsior	F	6
Geranium robertianum	O	6
Geum urbanum	O	7
Glechoma hederacea	O	7
Hyacinthoides non-scripta	F	6
Hypericum hirsutum	O	5
Lamiastrum galeobdolon	F	6
Mercurialis perennis	F	7
Rubus fruticosus	F	6
Scrophularia nodosa	R	6
Urtica dioica	F	8
Veronica montana	O	6
Viola sp.	R	N/A

A.6.8 Quadrat in Habitat parcel 4

Latin Name	DOMIN	Ellenberg value
Canopy		

Carpinus betulus	4	6
Castanea sativa	8	5
Fagus sylvatica	2	5
Fraxinus excelsior	3	6
Quercus robur	3	4
Understorey		
Cupressus sp.	2	N/A
Corylus avellana	3	6
Crataegus monogyna	2	6
Ilex aquifolium	1	5
Lonicera periclymenum	1	5
Field layer		
Circaea lutetiana	2	6
Dryopteris dilatata	1	5
Euphorbia amygdaloides	2	6
Fraxinus excelsior	7	6
Hyacinthoides non-scripta	2	6
Lamiastrum galeobdolon	3	6
Rubus fruticosus	3	6

A.6.9 Transect in Habitat parcel 5

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Fraxinus excelsior	F	6
Carpinus betulus	A	6
Castanea sativa	F	5
Fagus sylvatica	R	5
Understorey		
Rubus fruticosus	F	6
Acer campestre	R	6
Corylus avellana	O	6
Crataegus monogyna	R	6
Ribes rubrum	R	6
Crataegus laevigata	R	5
Sambucus nigra	O	7
Ilex aquifolium	O	5
Acer pseudoplatanus	R	6
Hedera helix	O	6
Lonicera periclymenum	R	5
Crataegus x media	R	N/A
Field layer		
Arum maculatum	R	7
Viola sp.	R	N/A
Circaea lutetiana	F	6

Latin Name	DAFOR	Ellenberg value
Potentilla sterilis	R	5
Mercurialis perennis	O	7
Rumex sanguineus	R	7
Glechoma hederacea	R	7
Vicia sepium	R	6
Mnium hornum	R	N/A
Dryopteris affinis	R	5
Ajuga reptans	R	5
Lysimachia nemorum	R	5
Deschampsia cespitosa	R	4
Prunus laurocerasus	R	6
Betula pendula	R	4
Anemone nemorosa	R	4
Epilobium montanum	R	6
Clematis vitalba	R	5
Arrhenatherum elatius	R	7
Galium aparine	R	8
Urtica dioica	R	8
Geranium robertianum	R	6
Stachys sylvatica	R	8

A.6.10 Quadrat in Habitat transect 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	6	5
Fraxinus excelsior	5	6
Betula pendula	1	4
Understorey		
Carpinus betulus	7	6
Crataegus sp.	4	N/A
Ilex aquifolium	1	5
Field layer		
Hyacinthoides non-scripta	5	6
Acer campestre	1	6
Bare ground	8	N/A

A.6.11 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	
2	3	
3	1	
4	3	
5	1	
6	2	

7	2	
8	2	
9	2	
10	1	
11	1	
12	1	
13	1	
Total:	22 (Poor)	

A.6.12 Condition assessment: Habitat parcel 2

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	1	
6	2	
7	2	
8	1	
9	3	
10	3	
11	1	
12	3	
13	2	
Total:	29 (Moderate)	

A.6.13 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	
5	1	
6	3	
7	2	
8	2	
9	3	
10	2	
11	1	
12	3	
13	2	
Total:	31 (Moderate)	

A.6.14 Condition assessment: Habitat parcel 4

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	

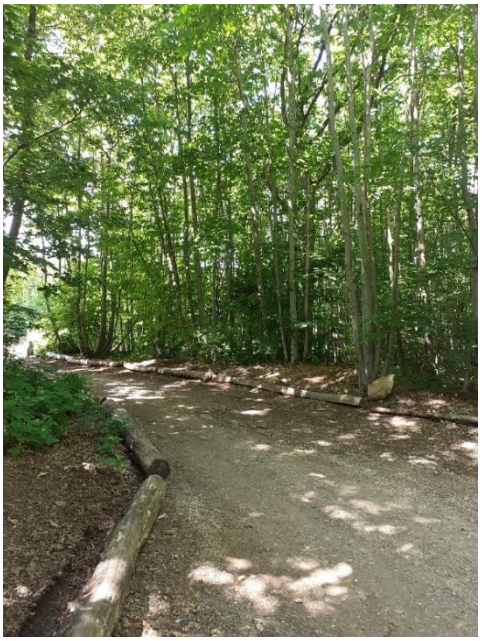
Woodland criteria	Score	Comments
5	1	
6	3	
7	2	
8	2	
9	3	
10	2	
11	1	
12	3	
13	2	
Total:	31 (Moderate)	

A.6.15 Condition assessment: Habitat parcel 5

Woodland criteria	Score	Comments
1	2	Two age classes present
2	3	No significant browsing
3	1	
4	3	
5	2	Sweet chestnut present
6	3	
7	2	
8	2	Some dieback present
9	3	Ancient woodland flora
10	2	
11	3	
12	3	
13	3	
Total:	32 (Moderate)	

A.6.16 Additional condition assessment notes: None

Photograph 1	Photograph 2

 Area of young trees, possibly remnant of relatively recent management with a yew tree in the background.	 Old sweet chestnut coppice with bare ground flora excluding occasional bramble
Photograph 3	**Photograph 4**
 A stand of spurge laurel (AWI)	 A clearing made through the woodland

Photograph 5	Photograph 6
 Clearing of open grassland space within woodland	 A young cherry laurel
Photograph 7	**Photograph 8**
 Deadwood present within woodland	 Ground layer of woodland dominated by bramble with a few reas of bare ground present

Photograph 9	Photograph 10
	
Some sections of woodland have large areas of bare ground	Areas of disturbance found, created by building works within woodland

A.7 Bridge Wood LWS

A.7.1 Note Transect 1 and Quadrat 1 lie within Bridge Wood AW but not Bridge Wood LWS

A.7.2 Transect in Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Fraxinus excelsior	O	6
Salix caprea	R	7
Betula pendula	R	4
Quercus robur	R	4
Understorey		
Carpinus betulus	F	6
Daphne laureola	O	5
Rubus fruticosus	A	6
Viburnum lantana	O	5
Acer campestre	R	6
Taxus baccata	R	5
Corylus avellana	O	6
Crataegus laevigata	O	5
Acer platanoides	R	7
Cornus sanguinea	R	6
Acer pseudoplatanus	R	6

Latin Name	DAFOR	Ellenberg value
Ligustrum vulgare	R	5
Field layer		
Iris foetidissima	O	5
Arum maculatum	O	7
Geum urbanum	F	7
Viola sp.	O	N/A
Circaea lutetiana	F	6
Fragaria vesca	O	4
Poa trivialis	O	6
Potentilla sterilis	R	5
Lysimachia nemorum	R	5
Anemone nemorosa	R	4
Primula vulgaris	O	4
Rumex sanguineus	F	7
Lamiastrum galeobdolon ssp montanum	O	N/A
Euphorbia amygdaloides	O	6
Hyacinthoides non-scripta	R	6
Dryopteris dilatata	O	5
Dryopteris filix-mas	O	5
Lonicera periclymenum	R	5
Epilobium ciliatum	R	6
Milium effusum	R	5
Carex sylvatica	O	5
Ajuga reptans	R	5
Ilex aquifolium	R	5
Rosa canina	R	6

A.7.3 Quadrat in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Fraxinus excelsior	4	6
Betula pendula	1	4
Quercus robur	2	4
Taxus baccata	2	5
Understorey		
Carpinus betulus	4	6
Corylus avellana	3	6
Viburnum lantana	3	5
Crataegus laevigata	4	5
Rubus fruticosus	5	6
Daphne laureola	3	5
Cornus sanguinea	2	6
Crataegus monogyna	2	6

Latin Name	DOMIN	Ellenberg value
Salix caprea	3	7
Rosa sp.	1	
Ilex aquifolium	1	5
Field layer		
Rubus fruticosus	7	6
Rumex sanguineus	3	7
Poa trivialis	1	6
Fragaria vesca	1	4
Lamiastrum galeobdolon	4	6
Fraxinus excelsior	4	6
Geum urbanum	2	7
Viburnum lantana	1	5
Arum maculatum	1	7
Castanea sativa	1	5
Crataegus monogyna	1	6
Primula vulgaris	1	4
Lonicera periclymenum	1	5
Viola sp.	2	N/A
Bare ground	6	N/A

A.7.4 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	F	6
Acer platanoides	R	7
Fraxinus excelsior	F	6
Betula pendula	R	4
Castanea sativa	A	5
Quercus robur	R	4
Acer pseudoplatanus	R	6
Fagus sylvatica	R	5
Prunus avium	R	6
Understorey		
Acer campestre	O	6
Cornus sanguinea	R	6
Daphne laureola	R	5
Corylus avellana	O	6
Crataegus x media	R	N/A
Rubus fruticosus	F	6
Ilex aquifolium	R	5
Sambucus nigra	R	7
Ligustrum vulgare	R	5
Taxus baccata	R	
Field layer		
Fraxinus excelsior	O	6

Latin Name	DAFOR	Ellenberg value
Arum maculatum	O	7
Viola sp.	O	N/A
Hyacinthoides non-scripta	O	6
Primula vulgaris	R	4
Mercurialis perennis	F	7
Euphorbia amygdaloides	R	6
Clematis vitalba	R	5
Iris foetidissima	R	5
Circaea lutetiana	O	6
Pteridium aquilinum	R	3
Dryopteris filix-mas	R	5
Poa trivialis	O	6
Urtica dioica	R	8
Dryopteris dilatata	R	5
Lonicera periclymenum	O	5
Anemone nemorosa	O	4
Hedera helix	F	6
Atrichum undulatum	R	N/A
Bare ground	A	N/A

A.7.5 Quadrat in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	6	5
Fraxinus excelsior	5	6
Betula pendula	1	4
Understorey		
Carpinus betulus	7	6
Crataegus sp.	4	N/A
Ilex aquifolium	1	5
Field layer		
Hyacinthoides non-scripta	5	6
Acer campestre	1	6
Bare ground	8	N/A

A.7.6 Transect in Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	F	5
Carpinus betulus	F	6
Quercus robur	O	4
Fraxinus excelsior	O	6
Fagus sylvatica	O	5

Latin Name	DAFOR	Ellenberg value
Prunus avium	O	6
Understorey		
Cupressus sp.	O	N/A
Acer pseudoplatanus	F	6
Cornus sanguinea	O	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Euonymus europaeus	R	5
Ilex aquifolium	O	5
Lonicera periclymenum	O	5
Sambucus nigra	R	7
Field layer		
Arum maculatum	R	7
Betula pendula	O	4
Circaea lutetiana	F	6
Dryopteris dilatata	F	5
Dryopteris filix-mas	F	5
Epilobium montanum	O	6
Euphorbia amygdaloides	O	6
Fraxinus excelsior	F	6
Geranium robertianum	O	6
Geum urbanum	O	7
Glechoma hederacea	O	7
Hyacinthoides non-scripta	F	6
Hypericum hirsutum	O	5
Lamiastrum galeobdolon	F	6
Mercurialis perennis	F	7
Rubus fruticosus	F	6
Scrophularia nodosa	R	6
Urtica dioica	F	8
Veronica montana	O	6
Viola sp.	R	N/A

A.7.7 Quadrat in Habitat parcel 4

Latin Name	DOMIN	Ellenberg value
Canopy		
Carpinus betulus	4	6
Castanea sativa	8	5
Fagus sylvatica	2	5
Fraxinus excelsior	3	6
Quercus robur	3	4
Understorey		

Cupressus sp.	2	N/A
Corylus avellana	3	6
Crataegus monogyna	2	6
Ilex aquifolium	1	5
Lonicera periclymenum	1	5
Field layer		
Circaea lutetiana	2	6
Dryopteris dilatata	1	5
Euphorbia amygdaloides	2	6
Fraxinus excelsior	7	6
Hyacinthoides non-scripta	2	6
Lamiastrum galeobdolon	3	6
Rubus fruticosus	3	6

A.7.8 Transect in Habitat parcel 5

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Fraxinus excelsior	F	6
Carpinus betulus	A	6
Castanea sativa	F	5
Fagus sylvatica	R	5
Understorey		
Rubus fruticosus	F	6
Acer campestre	R	6
Corylus avellana	O	6
Crataegus monogyna	R	6
Ribes rubrum	R	6
Crataegus laevigata	R	5
Sambucus nigra	O	7
Ilex aquifolium	O	5
Acer pseudoplatanus	R	6
Hedera helix	O	6
Lonicera periclymenum	R	5
Crataegus x media	R	N/A
Field layer		
Arum maculatum	R	7
Viola sp.	R	N/A
Circaea lutetiana	F	6
Potentilla sterilis	R	5
Mercurialis perennis	O	7
Rumex sanguineus	R	7
Glechoma hederacea	R	7
Vicia sepium	R	6
Mnium hornum	R	N/A

Latin Name	DAFOR	Ellenberg value
Dryopteris affinis	R	5
Ajuga reptans	R	5
Lysimachia nemorum	R	5
Deschampsia cespitosa	R	4
Prunus laurocerasus	R	6
Betula pendula	R	4
Anemone nemorosa	R	4
Epilobium montanum	R	6
Clematis vitalba	R	5
Arrhenatherum elatius	R	7
Galium aparine	R	8
Urtica dioica	R	8
Geranium robertianum	R	6
Stachys sylvatica	R	8

A.7.9 Quadrat in transect 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	6	5
Fraxinus excelsior	5	6
Betula pendula	1	4
Understorey		
Carpinus betulus	7	6
Crataegus sp.	4	N/A
Ilex aquifolium	1	5
Field layer		
Hyacinthoides non-scripta	5	6
Acer campestre	1	6
Bare ground	8	N/A

A.7.10 Condition assessment: Habitat Parcel 2

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	1	
6	2	
7	2	
8	1	
9	3	
10	3	
11	1	
12	3	
13	2	
Total:	29 (Moderate)	

A.7.11 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	
5	1	
6	3	
7	2	
8	2	
9	3	
10	2	
11	1	
12	3	
13	2	
Total:	31 (Moderate)	

A.7.12 Condition assessment: Habitat parcel 4

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	
5	1	
6	3	
7	2	
8	2	
9	3	
10	2	
11	1	
12	3	
13	2	
Total:	31 (Moderate)	

A.7.13 Condition assessment: Habitat parcel 5

Woodland criteria	Score	Comments
1	2	Two age classes present
2	3	No significant browsing
3	1	
4	3	
5	2	Sweet chestnut present
6	3	
7	2	
8	2	Some dieback present
9	3	Ancient woodland flora
10	2	

11	3	
12	3	
13	3	
Total:	32 (Moderate)	

A.7.14 Additional condition assessment notes: None

A.8 Chadwell Wood AW ThemeID1119923

A.8.1 Habitat parcel 1 (woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Prunus avium	O	6
Quercus robur	A	4
Understorey		
Acer campestre	F	6
Crataegus monogyna	O	6
Euonymus europaeus	R	5
Field layer		
Alliaria petiolata	F	8
Anthriscus sylvestris	R	7
Arum maculatum	O	7
Galium aparine	O	8
Geum urbanum	O	7
Hedera helix	F	6
Hyacinthoides non-scripta	F	6
Rubus fruticosus	F_D	6
Stellaria holostea	R	6
Urtica dioica	O	8

A.8.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus robur	8	4
Prunus avium	3	6
Understorey		
Acer campestre	4	6
Crataegus monogyna	2	6
Euonymus europaeus	1	5
Prunus avium	4	6
Field layer		
Acer campestre	3	6
Alliaria petiolata	8	8
Anthriscus sylvestris	3	7
Galium aparine	3	8
Hedera helix	3	6

A.8.3 Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	O	4
Understorey		
Prunus avium	O	6
Prunus spinosa	O	6
Field layer		
Acer campestre	R	6
Achillea millefolium	O	4
Agrostis capillaris	A	4
Alliaria petiolata	R	8
Anthoxanthum odoratum	F	3
Arrhenatherum elatius	F-D	7
Bromus hordeaceus	O	4
Cynosurus cristatus	F	4
Cytisus scoparius	R	4
Dactylis glomerata	F-D	6
Festuca rubra	F	5
Holcus lanatus	O	5
Hyacinthoides non-scripta	R	6
Lactuca serriola	O	6
Malva sp.	R	N/A
Phleum bertolonii	F	4
Plantago lanceolata	O	4
Rubus fruticosus	R	6
Rumex acetosa	O	4
Senecio jacobaea	O	4

A.8.4 Quadrat 2 in Habitat parcel 2 (grassland)

Latin Name	DOMIN	Ellenberg value
Field layer		
Arrhenatherum elatius	6	7
Dactylis glomerata	4	6
Senecio jacobaea	1	4
Agrostis capillaris	8	4
Phleum bertolonii	3	4
Holcus lanatus	4	5

A.8.5 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	2	
5	3	
6	3	
7	3	
8	2	

9	2	Garlic mustard and bluebell visible and reasonably common but conditions very dry and AWI likely missed
10	2	
11	1	
12	3	
13	3	
Total:	32 (Moderate)	

A.8.6 Condition assessment: Habitat parcel 2

Grassland criteria	Score	Comments
1	Yes	
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	Really difficult to see species but judging by the range of grasses it would have had. In the quadrat there were only 5 species in quadrat.
Total:	Moderate	

A.8.7 Additional condition assessment notes: N/A

Photograph 1	**Photograph 2**
 An ungrazed area of grassland within open woodland dominated by false oat grass and Cocksfoot	 A path cuts through the site.
Photograph 3	**Photograph 4**

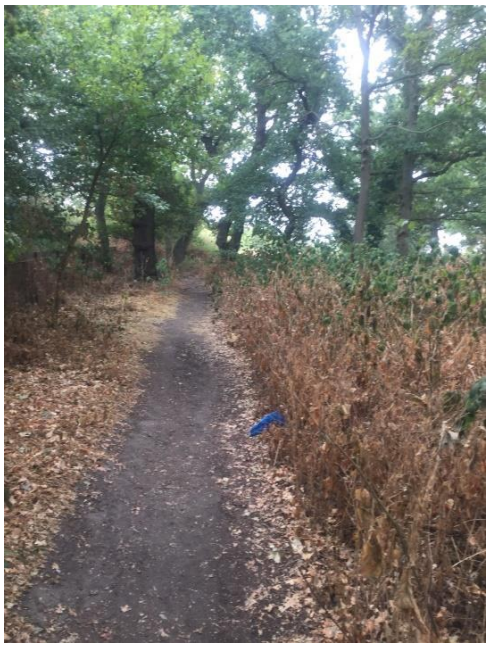
Oak woodland with well spaced trees, approximately 30-40cm DBH

Photograph 5

Occasional wild cherries present in the canopy

Photograph 6

Field layer dominated by bramble



Footpath with some rubbish disposed within the site

A.9 Claylane Wood AW

A.9.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	R	4
Salix caprea	O	7

Latin Name	DAFOR	Ellenberg value
Castanea sativa	D	5
Carpinus betulus	O	6
Prunus avium	O	6
Understorey		
Prunus cerasifera	R	6
Ribes rubrum	O and LA	6
Cornus sanguinea	R	6
Sambucus nigra	O	7
Field		
Anemone nemorosa	F	4
Hyacinthoides non-scripta	A	6
Galium aparine	R	8
Geranium robertianum	R	6
Rubus fruticosus	F	6
Hedera helix	F	6
Ranunculus ficaria	O	6
Lonicera periclymenum	R	5
Viola sp	R	4
Geum urbanum	O	7
Arum maculatum	R	7
Poa trivialis	O	6
Stachys sylvatica	R	8
Conopodium majus	R	5
Mercurialis perennis	O and LA	7
Dryopteris filix-mas	R	5
Acer campestre	R	6
Alliaria petiolata	R	8
Dryopteris dilatata	O	5
Lamiastrum galeobdolon	R	6
Veronica montana	R	6
Circaea lutetiana	O	6
Rumex sanguineus	O	7
Carex sylvatica	R	5
Ajuga reptans	R	5
Polystichum setiferum	R	6
Urtica dioica	R	8
Clematis vitalba	R	5
Arctium minus	R	5
Epilobium hirsutum	R	7
Prunus avium	O	6
Fraxinus excelsior	R	6
Ilex aquifolium	R	5
Crataegus monogyna	O	6

A.9.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	8	5

Carpinus betulus	4	6
Prunus avium	2	6
Salix caprea	1	7
Fraxinus excelsior	1	6
Understorey		
Sambucus nigra	4	7
Ilex aquifolium	3	5
Prunus cerasifera	1	6
Crataegus monogyna	1	6
Ribes rubrum	1	6
Lonicera periclymenum	1	5
Quercus robur	1	4
Carpinus betulus	3	6
Field		
Hyacinthoides non-scripta	*6*	6
Circaea lutetiana	*4*	6
Geum urbanum	*1*	7
Rubus fruticosus	*4*	6
Dryopteris filix-mas	*2*	5
Anemone nemorosa	*5*	4
Ranunculus ficaria	*3*	6
Dryopteris dilatata	*2*	5
Poa nemoralis	*3*	5
Poa trivialis	*1*	6

A.9.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	1	
6	2	
7	2	
8	3	
9	3	
10	2	
11	1	
12	1	
13	2	
Total:	28 (Moderate)	

A.9.4 Additional condition assessment notes: None

Photograph 1	Photograph 2

Semi mature hornbeam adjacent to maintained path

Fallen and standing deadwood among old coppice

Photograph 3

Photograph 4

Campfire showing evidence of human activity within woodland

Evidence of campfire and tree damage.

A.10 Cobham Woods SSSI and Great Wood AW (Overlapping site)

A.10.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		

Latin Name	DAFOR	Ellenberg value
Castanea sativa	A	5
Carpinus betulus	F	6
Betula pendula	R	4
Rhamnus cathartica	R	6
Fagus sylvatica	R	5
Quercus robur	R	4
Salix caprea	R	7
Prunus avium	R	6
Understorey		
Rubus fruticosus	A	6
Ilex aquifolium	F	5
Crataegus monogyna	O	6
Corylus avellana	O	6
Lonicera periclymenum	O	5
Acer campestre	O	6
Ligustrum vulgare	O	5
Ribes rubrum	R	6
Ruscus aculeatus	R	4
Clematis vitalba	R	5
Rosa sp.	R	NA
Prunus laurocerasus	R	6
Sambucus nigra	R	7
Field layer		
Arum maculatum	F	7
Circaea lutetiana	O	6
Fraxinus excelsior	O	6
Geum urbanum	O	7
Rumex sanguineus	O	7
Brachypodium sylvaticum	O	5
Viola sp.	O	N/A
Mercurialis perennis	O	7
Urtica dioica	O	8
Pteridium aquilinum	O	3
Carex pendula	R	6
Ajuga reptans	R	5
Lysimachia nemorum	R	5
Lamiastrum galeobdolon	R	6
Hyacinthoides non-scripta	R	6
Fragaria vesca	R	4
Dryopteris dilatata	R	5
Primula vulgaris	R	4
Veronica chamaedrys	R	5
Cardamine sp.	R	N/A
Heracleum sphondylium	R	7
Dryopteris filix-mas	R	5
Holcus mollis	R	3

Latin Name	DAFOR	Ellenberg value
Tamus communis	R	6

A.10.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	10	5
Fraxinus excelsior	1	6
Prunus avium	1	6
Understorey		
Corylus avellana	4	6
Crataegus monogyna	2	6
Rubus fruticosus	8	6
Acer campestre	3	6
Carpinus betulus	3	6
Field layer		
Rubus fruticosus	8	6
Poa trivialis	4	6
Circaea lutetiana	5	6
Mercurialis perennis	3	7
Hyacinthoides non-scripta	4	6
Fraxinus excelsior	2	6
Arum maculatum	1	7
Geum urbanum	1	7
Rhamnus cathartica	1	6
Bare ground	5	N/A

A.10.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	
2	3	
3	1	
4	3	
5	1	
6	3	
7	1	
8	3	
9	3	
10	2	
11	1	
12	1	
13	2	
Total:	26 (Moderate)	

A.10.4 Additional condition assessment notes: None

Photograph 1

Bramble ground layer among old sweet chestnut coppice

A.11 Codham Hall Wood AW and LWS

A.11.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	A	6
Betula pendula	O	4
Acer campestre	O	6
Acer platanoides	R	7
Sorbus torminalis	R	5
Quercus robur	O	4
Understorey		
Crataegus monogyna	F	6
Ilex aquifolium	R	5
Taxus baccata	O	5
Castanea sativa	O	5
Ground layer		
Ajuga reptans	R	5
Hyacinthoides non-scripta	F	6
Arum maculatum	R	7
Galium aparine	F	8
Urtica dioica	F	8
Poa trivialis	F	6
Geranium robertianum	O	6

Latin Name	DAFOR	Ellenberg value
Rubus fruticosus	F_and LA	6
Anemone nemorosa	F	4
Glechoma hederacea	F	7
Milium effusum	F	5
Dactylis glomerata	O	6
Geum urbanum	O	7
Arrhenatherum elatius	O	7
Cytisus scoparius	R	4
Senecio jacobaea	R	4
Scrophularia nodosa	R	6
Carex pendula	O	6
Heracleum sphondylium	R	7
Dipsacus fullonum	R	7
Galium mollugo	O	4
Silene dioica	O	7
Pastinaca sativa	R	5
Lonicera periclymenum	F	5
Holcus lanatus	O	5
Rumex sanguineus	O	7
Cirsium vulgare	R	6
Juncus effusus	R	4
Carex remota	R	6
Festuca rubra	R	5
Dryopteris filix-mas	R	5
Melica uniflora	O	5
Digitalis purpurea	R	5

A.11.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Carpinus betulus	10	6
Sorbus torminalis	4	5
Quercus robur	1	4
Understorey		
Taxus baccata	1	5
Castanea sativa	1	5
Lonicera periclymenum	3	5
Field layer		

Rubus fruticosus	9	6
Lonicera periclymenum	2	5
Carpinus betulus	1	6
Hypericum perforatum	2	5
Hyacinthoides non-scripta	2	6
Milium effusum	1	5

A.11.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	1	
2	2	Deer browsing signs
3	3	No invasives
4	3	Yes, but overwhelmingly dominated by hornbeam
5	3	
6	1	Very little open space
7	2	
8	3	
9	3	Present but could be more prolific
10	1	
11	2	A couple of old oaks at southern end
12	2	
13	3	None evident
Total:	29 (Moderate)	

A.11.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
	
Dense bramble ground flora and some fallen deadwood among old stands of semi mature trees	Dense bramble ground layer

Photograph 3	
	
Sparse stands of birch and hornbeam with a carpet of old bluebell	

A.12 Court Wood etc., Shorne LWS (overlaps Peartree Wood AW)

A.12.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	F	5
Quercus robur	R	4
Fraxinus excelsior	O	6
Understorey		
Ribes rubrum	R	6
Ligustrum vulgare	R	5
Corylus avellana	F	6
Ilex aquifolium	O	5
Viburnum lantana	R	5
Field layer		
Crataegus monogyna	O	6
Fraxinus excelsior	O	6
Carex sylvatica	R	5
Rubus fruticosus	F	6
Dryopteris dilatata	O	5
Hyacinthoides non-scripta	F	6
Circaea lutetiana	F	6
Rumex sanguineus	R	7
Hedera helix	F	6
Euphorbia amygdaloides	O	6
Veronica montana	R	6
Anemone nemorosa	R	4
Veronica chamaedrys	R	5

Geum urbanum	O	7
Viola sp.	O	N/A
Lonicera periclymenum	F	5

A.12.2 Quadrat 1 (in transect 1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	7	5
Quercus robur	3	4
Fraxinus excelsior	1	6
Understorey		
Corylus avellana	7	6
Ilex aquifolium	2	5
Field layer		
Poa trivialis	4	6
Arum maculatum	2	7
Hyacinthoides non-scripta	4	6
Euphorbia amygdaloides	1	6
Rubus fruticosus	4	6
Fraxinus excelsior	3	6
Circaea lutetiana	3	6
Anemone nemorosa	2	4
Hedera helix	2	6
Geum urbanum	1	7
Mercurialis perennis	1	7
Viola sp.	2	N/A

A.12.3 Transect 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Quercus robur	R	4
Understorey		
Corylus avellana	O	6
Cornus sanguinea	O	6
Euonymus europaeus	R	5
Malus sylvestris	R	6
Prunus laurocerasus	R	6
Crataegus monogyna	R	6
Carpinus betulus	R	6
Ilex aquifolium	R	5
Field layer		
Rubus fruticosus	A	6
Lysimachia nemorum	R	5

Latin Name	DAFOR	Ellenberg value
Ribes rubrum	R	6
Primula vulgaris	R	4
Euphorbia amygdaloides	R	6
Hyacinthoides non-scripta	F	6
Anemone nemorosa	O	4
Dryopteris dilatata	O	5
Lonicera periclymenum	F	5
Geum urbanum	O	7
Holcus mollis	R	3
Hedera helix	F	6
Scrophularia nodosa	R	6
Circaea lutetiana	O	6
Veronica montana	R	6
Hyacinthoides non-scripta	F	6
Dryopteris filix-mas	R	5
Veronica serpyllifolia	R	5
Prunella vulgaris	R	4
Prunus avium	R	6
Juncus effusus	R	4
Carex pendula	R	6
Carex sylvatica	F	5
Fragaria vesca	O	4
Viola sp.	O	N/A
Rosa sp.	R	N/A
Rumex sanguineus	O	7
Vicia sepium	R	6
Hypericum androsaemum	R	5
Melica uniflora	O	5
Poa nemoralis	R	5
Alliaria petiolata	R	8
Heracleum sphondylium	R	7
Mercurialis perennis	O	7
Cirsium palustre	R	4
Hypericum pulchrum	R	3

A.12.4 Quadrat 2 (in transect 2)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Understorey		
Corylus avellana	4	6
Ilex aquifolium	1	5
Field layer		
Rubus fruticosus	8	6
Lonicera periclymenum	4	N/A

Latin Name	DOMIN	Ellenberg value
Hyacinthoides non-scripta	3	6
Leaf litter	5	N/A

Quadrat 3 (in transect 2)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Understorey		
Carpinus betulus	1	6
Corylus avellana	4	6
Field layer		
Rubus fruticosus	8	6
Lonicera periclymenum	4	5
Hyacinthoides non-scripta	4	6
Mercurialis perennis	6	7

A.12.5 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	2	
5	2	
6	2	
7	2	
8	3	
9	3	
10	2	
11	1	
12	1	
13	2	
Total:	28 (Moderate)	

A.12.6 Condition assessment: Habitat parcel 2

Woodland criteria	Score	Comments
1	1	
2	3	
3	2	
4	1	
5	1	
6	3	
7	2	
8	3	
9	3	

10	2	
11	2	
12	1	
13	3	
Total:	27 (Moderate)	

A.12.7 Additional condition assessment notes: None

Photograph 1	**Photograph 2**
 Old sweet chestnut coppice with hazel understory	 Area of open space with grazed wood sedge (AWI) present
Photograph 3	**Photograph 4**
	

Wild strawberry (AWI) within ground flora assemblage	Area of standing water and open space with various species of fern
Photograph 5	
 Mature sweet chestnut	

A.13 Cuxton no 3 Pit LWS (habitat mosaic)

A.13.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Populus tremula	R	6
Alnus cordata	O	N/A
Populus alba	R	6
Populus tremula	O	6
Acer pseudoplatanus	R	6
Salix sp.	O	N/A
Betula pendula	F	4
Understorey		
Cotoneaster coriaceus	F	N/A
Cornus sanguinea	O	6
Cotoneaster horizontalis	F	4
Viburnum lantana	F	5
Prunus avium	R	6
Buddleja davidii	F	5
Field layer		
Calystegia sepium	R	7

Latin Name	DAFOR	Ellenberg value
Brachypodium sylvaticum	F	5
Arrhenatherum elatius	R	7
Lotus corniculatus	O	2
Festuca rubra	R	5
Dactylis glomerata	R	6
Tussilago farfara	O	6
Hypericum perforatum	O	5
Crepis biennis	O	6
Senecio jacobaea	R	4
Fragaria vesca	O	4
Agrostis stolonifera	R	6
Pilosella officinarum	F	2
Holcus lanatus	R	5
Geranium robertianum	O	6
Origanum vulgare	O	4
Hieraceum agg.	R	N/A
Prunella vulgaris	R	4
Leontodon hispidus	O	3
Carpinus betulus	O	6
Taraxacum officinale agg.	O	6
Pinus sp.	R	N/A
Glyceria maxima	R	8
Quercus robur	O	4
Carex sylvatica	R	5
Linum catharticum	R	2
Medicago lupulina	O	4
Phleum pratense	R	6
Sonchus oleraceus	R	7
Lythrum salicaria	LA	5
Epilobium hirsutum	LA	7
Rumex crispus	R	6
Phragmites australis	LA	6
Carpinus betulus	R	6
Dryopteris filix-mas	R	5
Chamerion angustifolium	R	5
Ligustrum vulgare	O	5
Dactylorhiza fuchsii	R	3
Anthyllis vulneraria	O	2
Sanguisorba minor	R	3
Clematis vitalba	O	5
Achillea millefolium	R	4

Latin Name	DAFOR	Ellenberg value
Centranthus ruber	R	5
Daucus carota	R	8
Sorbus aucuparia	R	4
Centaurium erythraea	R	3
Corylus avellana	O	6
Viola sp.	R	N/A
Castanea sativa	R	5
Blackstonia perfoliata	R	2
Acer campestre	R	6
Euphrasia sp.	R	N/A
Polygala vulgaris	R	3
Leycesteria formosa	R	N/A
Pseudoscleropodium purum	F	N/A
Calliergonella cuspidatum	F	N/A

A.13.2 Quadrat 1 (in woodland, w1g)

Latin Name	DOMIN	Ellenberg value
Canopy		
Betula pendula	8	4
Carpinus betulus	3	6
Alnus cordata	4	N/A
Understorey		
Salix sp.	3	N/A
Cornus sanguinea	3	6
Buddleja davidii	4	5
Castanea sativa	3	5
Cotoneaster coriaceus	7	N/A
Ligustrum vulgare	1	5
Viburnum lantana	4	5
Field layer		
Fragaria vesca	3	4
Brachypodium sylvaticum	7	5
Rubus fruticosus	3	6
Acer campestre	2	6
Carex pendula	2	6
Potentilla reptans	3	5
Epilobium tetragonum	3	5
Rosa sp.	2	N/A
Senecio jacobaea	1	4
Origanum vulgare	1	4
Cornus sanguinea	5	6

Latin Name	DOMIN	Ellenberg value
Viola sp.	2	N/A
Lotus corniculatus	1	2
Dactylorhiza fuchsii	1	3
Quercus robur	2	4
Betula pendula	3	4
Clematis vitalba	2	5
Cotoneaster coriaceus	2	N/A
Fraxinus excelsior	1	6
Viburnum lantana	4	5
Alnus cordata	2	N/A

A.13.3 Quadrat 2 (in mixed scrub)

Latin Name	DOMIN	Ellenberg value
Canopy		
Cotoneaster coriaceus	9	N/A
Cotoneaster horizontalis	3	4
Salix sp.	3	N/A
Betula pendula	3	4
Buddleja davidii	1	5
Cornus sanguinea	4	6
Viburnum lantana	3	5
Understorey		
Lathyrus latifolius	2	3
Polygala vulgaris	1	3
Pilosella officinarum	3	2
Daucus carota	1	8
Carpinus betulus	1	6
Brachypodium sylvaticum	3	5
Crataegus monogyna	1	6

A.13.4 Vegetation around the two ponds

Latin Name	DAFOR	Ellenberg value
Balancing pond		
Polypogon viridis	R	N/A
Bolboschoenus maritimus	O	7
Typha latifolia	F	7
Lythrum salicaria	O	5
Epilobium hirsutum	F	7
Rumex crispus	R	6
Phragmites australis	F	6

Latin Name	DAFOR	Ellenberg value
Natural pond		
Phragmites australis	F	6
Carex pendula	R	6
Carex pseudocyperus	R	6
Glyceria maxima	R	8
Rumex hydrolapathum	R	6
Ranunculus lingua	R	7

A.13.5 Condition assessment: Quadrat 1 (in woodland w1g)

Woodland criteria	Score	Comments
1	1	
2	3	
3	1	A lot present
4	3	
5	1	50-80% for canopy, but <50% for understorey
6	2	
7	3	
8	3	
9	1	
10	2	
11	1	
12	1	
13	3	
Total:	25 (Poor)	

A.13.6 Condition assessment: Quadrat 2 (in mixed scrub)

Scrub criteria	Score	Comments
1	No	
2	No	Immature
3	No	
4	No	
5	Yes	Scattered scrub adjacent but no tall grassland
Total:	Poor	

A.13.7 Additional condition assessment notes: None

Photograph 1	Photograph 2

	
Bare ground with only occasional small patches of birds foot trefoil, yellowwort and eyebright, otherwise developing straight from bare ground to scrub, predominantly birch and cotoneaster coriaceous	Area of secondary birch woodland with frequent Italian alder, over dogwood, cotoneaster coriaceous, wayfaring tree, with a ground layer of wood false brome, wild strawberry and pendulous sedge. Canopy very open, so quite recently succeeded from scrub
Photograph 3	
	
Large balancing pond with an exposed liner with inflow from the adjacent housing estate. Largely dry but with two areas of shallow standing water one at each end supporting bulrush, club rush, great willowherb, and purple loosestrife. Surrounding area is completely unmanaged with patches of calcareous ephemeral/short perennial habitat rapidly succeeding to scrub and woodland. Cotoneaster and buddleia are particularly widespread.	

A.14 Epping Forest SAC and Epping Forest SSSI (overlapping sites and partly overlaps with Epping-Ambresbury Banks AW)

A.14.1 Habitat Parcel 1: Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	A	4
Betula pendula	F	4
Fraxinus excelsior	F	6
Field		
Prunus spinosa	R	6
Corylus avellana	O	6
Acer campestre	O	6
Malus sylvestris	O	6
Carpinus betulus	F	6
Ilex aquifolium	F	5
Crataegus monogyna	F	6
Understory		
Rubus fruticosus	F	6
Urtica dioica	O	8
Juncus effusus	F	4
Holcus lanatus	F	5
Circaea lutetiana	F	6
Agrostis stolonifera	F	6
Geum urbanum	F	7
Atrichum undulatum	O	5
Fraxinus excelsior	F	6
Deschampsia cespitosa	O	4
Dryopteris filix-mas	F	5
Galium aparine	F	8
Rumex sanguineus	F	7
Alliaria petiolata	O	8
Poa trivialis	F	6
Dactylis glomerata	R	6
Glechoma hederacea	F	7
Arrhenatherum elatius	R	7
Carex remota	F	6
Senecio jacobaea	O	4
Poa annua	O	7
Veronica serpyllifolia	O	5
Pteridium aquilinum	F	3
Dryopteris dilatata	R	5
Athyrium filix-femina	R	6
Digitalis purpurea	O	5
Ribes uva-crispa	R	6
Lonicera periclymenum	R	5
Carex pendula	R	6
Ribes rubrum	R	6

A.14.2 Habitat Parcel 1 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus robur	8	4
Betula pendula	4	4
Fraxinus excelsior	3	6
Understorey		
Ilex aquifolium	4	5
Malus sp.	3	
Crataegus monogyna	2	6
Carpinus betulus	5	6
Acer campestre	1	6
Corylus avellana	1	6
Prunus spinosa	1	6

A.14.3 Condition assessment: Habitat Parcel 1 Transect 1

Woodland criteria	Score	Comments
1	2	Lack of saplings.
2	2	Some signs of browsing pressure (damaged bark).
3	1	One cherry laurel.
4	3	
5	3	Non-natives scarce.
6	3	Difficult to say without walking the entire wood as it's a big wood. Assumed good on basis of acid grassland in citation.
7	2	Lack of saplings.
8	3	
9	3	A few indicators present.
10	2	
11	3	
12	3	Abundant.
13	2	Sewage outflow present.
Total:	32 (Moderate)	

A.14.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Slow flowing watercourse in more open area of the forest	 Stands of oak and sweet chestnut among bramble ground layer and bare ground paths
Photograph 3	**Photograph 4**
 Clearing in woodland, potentially active management with a great variety of ground flora	 Ancient woodland indicator carpet of bluebell and wood anemone

A.15 Epping-Ambresbury Banks AW (Partly overlaps Epping Forest SSSI & SAC)

A.15.1 Habitat parcel 1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	O to A	6
Betula pendula	O	4
Fagus sylvatica	O to F	5
Pinus nigra	F	2
Pinus sylvestris	A	2
Prunus avium	O	6
Quercus robur	A	4
Quercus rubra	R	N/A
Sequioia sempervirens	R	N/A
Understorey		
Acer pseudoplatanus	O	6
Chamaecyparis lawsoniana	R	4
Picea sitchensis	R	2
Rhododendron ponticum	R	3
Sambucus nigra	R	7
Field layer		
Agrostis capillaris	O	4
Deschampsia cespitosa	O	4
Digitalis purpurea	F	5
Festuca rubra	R	5
Glechoma hederacea	R	7
Holcus mollis	F	3
Juncus effusus	R	4
Juncus inflexus	O	5
Pteridium aquilinum	F	3
Rubus fruticosus	R	6
Senecio jacobaea	R	4
Urtica dioica	O	8

A.15.2 Habitat parcel 1 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	5	6
Fagus sylvatica	5	5
Picea sitchensis	1	2
Quercus robur	7	4
Understorey		
Acer pseudoplatanus	3	6
Field layer		
Holcus mollis	6	3
Pteridium aquilinum	8	3
Rhododendron ponticum	1	3

A.15.3 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	1	20 to 150 years
2	1	

Woodland criteria	Score	Comments
3	1	
4	2	
5	1	
6	1	
7	1	
8	3	
9	2	Ground layer recognisably W10 but very species poor
10	2	Quite a lot of semi-mature sycamore, which forms a sub canopy in places
11	1	
12	2	
13	2	A lot of bare ground due to deer
Total:	20 (Poor)	

A.15.4 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 Rhododendron within forest	 Semi mature beech stands with dogs' mercury carpet
Photograph 3	**Photograph 4**
 Bluebells (AWI) among relatively old coppice	 Clearing within woodland showing diverse assemblage of regenerating flora among some mature trees, potentially indicating active management

Photograph 5

Maintained path through woodland

A.16 Franks Wood and Cranham Brickworks SINC

A.16.1 Habitat Parcel 1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	F	4
Understorey		
Crataegus monogyna	F	6
Sambucus nigra	R	7
Euonymus europaeus	R	5
Field layer		
Rubus fruticosus	F	6
Dryopteris filix-mas	R	5
Arrhenatherum elatius	R	7
Lathyrus pratensis	R	5
Geum urbanum	R	7
Agrostis stolonifera	R	6
Agrostis capillaris	R	4
Milium effusum	R	5
Ilex aquifolium	O	5
Prunus avium	O	6
Fraxinus excelsior	O	6
Cornus sanguinea	O	6
Urtica dioica	L/F	8
Rumex sanguinea	R	N/A
Holcus lanatus	R	5
Arum maculatum	R	7
Juncus conglomeratus	R	3
Phleum pratense	R	6

Latin Name	DAFOR	Ellenberg value
Rosa sp.	R	N/A
Hedera helix	F	6
Dactylis glomerata	O	6
Acer campestre	O	6
Galium aparine	R	8
Carex pendula	R	6

A.16.2 Habitat Parcel 1 Quadrat (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus robur	6	4
Understorey		
Crataegus monogyna	8	5
Prunus padus	4	N/A
Field layer		
Rubus fruticosus	5	6
Carex pendula	1	6
Crataegus monogyna	3	6
Hedera helix	6	6
Prunus spinosa	4	6
Ilex aquifolium	1	5
Bare ground and leaf litter	5	N/a

A.16.3 Condition assessment: Habitat Parcel 1 Transect 1

Woodland criteria	Score	Comments
1	2	No old trees
2	2	Evidence of deer browsing
3	3	None
4	3	Not very diverse but at least 5 present
5	3	
6	1	Almost none
7	3	
8	3	
9	2	Only very occasional wood millet (Milium effusum) amongst AWI
10	2	
11	1	
12	1	Only small dead wood stems present
13	3	No signs
Total:	29 (Moderate)	

A.16.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
	
Mature stand amongst very bare woodland ground	Ground damaged from dumping

Photograph 3

Pendulous sedge (AWI)

A.17 Frith Impton AW

A.17.1 Habitat parcel 1 Transect 1

Scientific Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	O	4
Carpinus betulus	F	6
Castanea sativa	F	5
Fagus sylvatica	R	5
Prunus avium	O	6
Prunus laurocerasus	O	6
Quercus robur	F	4
Understorey		

Scientific Name	DAFOR	Ellenberg value
Acer campestre	R	6
Acer pseudoplatanus	R	6
Corylus avellana	R	6
Crataegus laevigata	R	5
Ilex aquifolium	F	5
Lonicera nitida	R	N/A
Ribes rubrum	R	6
Rosa sp.	O	N/A
Rubus fruticosus	F	6
Symphoricarpos albus	R	7
Taxus baccata	O	5
Field layer		
Acer platanoides	O	7
Anemone nemorosa	R	4
Arum maculatum	R	7
Brachypodium sylvaticum	R	5
Carex remota	R	6
Carex sylvatica	R	5
Deschampsia cespitosa	R	4
Dryopteris dilatata	R	5
Euphorbia amygdaloides	R	6
Geum urbanum	R	7
Hedera helix	F	6
Hyacinthoides non-scripta	O	6
Lamiastrum galeobdolon	R	6
Lonicera periclymenum	F	5
Milium effusum	R	5
Poa nemoralis	R	5
Pteridium aquilinum	R	3
Sorbus aucuparia	R	4
Viola sp.	R	N/A

A.17.2 Habitat parcel 1 Quadrat 1

Scientific Name	DOMIN	Ellenberg value
Canopy		
Betula pendula	4	4
Carpinus betulus	4	6
Castanea sativa	7	5
Prunus avium	4	6
Quercus robur	4	4
Understorey		
Acer pseudoplatanus	2	6
Crataegus laevigata	3	5
Ilex aquifolium	2	5
Prunus laurocerasus	2	6

Scientific Name	DOMIN	Ellenberg value
Rosa sp.	1	N/A
Sorbus aucuparia	2	4
Field layer		
Fagus sylvatica	1	5
Rubus fruticosus	5	6
Sorbus aucuparia	1	4
Leaf litter	8	N/A

A.17.3 Habitat parcel 2 Transect

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	R	4
Carpinus betulus	F	6
Castanea sativa	O	5
Fagus sylvatica	F	5
Malus sylvestris	R	6
Prunus avium	R	6
Quercus robur	R	4
Sorbus aucuparia	R	4
Understorey		
Acer campestre	R	6
Cornus sanguinea	R	6
Corylus avellana	R	6
Crataegus laevigata	R	5
Crataegus monogyna	O	6
Ilex aquifolium	O	5
Prunus laurocerasus	R	6
Taxus baccata	R	5
Field layer		
Rosa sp.	R	N/A
Acer campestre (seedling)	O	6
Acer platanoides (seedling)	R	7
Acer pseudoplatanus (seedling)	R	6
Alliaria petiolata	R	8
Anemone nemorosa	R	4
Arum maculatum	R	7
Brachypodium sylvaticum	O	5
Carex sylvatica	LA	5
Deschampsia cespitosa	R	4
Dryopteris dilatata	R	5
Dryopteris filix-mas	R	5
Fagus sylvatica (seedling)	O	5
Fraxinus excelsior (seedling)	O	6
Geranium robertianum	R	6
Geum urbanum	R	7
Hedera helix	A	6
Hyacinthoides non-scripta	O	6
Ilex aquifolium (seedling)	O	5
Phyllitis scolopendrium	R	5

Latin Name	DAFOR	Ellenberg value
Poa trivialis	R	6
Potentilla sterilis	R	5
Prunus avium (seedling)	R	6
Pteridium aquilinum	R	3
Rubus fruticosus	A	6
Taxus baccata (seedling)	R	5
Urtica dioica	R	8
Viola sp.	R	N/A

A.17.4 Quadrat 2 in Habitat parcel 2

Scientific Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	1	6
Betula pendula	2	4
Carpinus betulus	7	6
Corylus avellana	1	6
Fagus sylvatica	4	5
Prunus avium	2	6
Quercus robur	5	4
Sorbus aucuparia	1	4
Understorey		
Crataegus monogyna	1	6
Field Layer		
Brachypodium sylvaticum	2	5
Carex sylvatica	1	5
Carpinus betulus	1	6
Hedera helix	5	6
Rubus fruticosus	5	6
Leaf litter	7	N/A

A.17.5 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Betula pendula	R	4
Castanea sativa	A	5
Prunus avium	R	6
Understorey		
Acer campestre	R	6
Carpinus betulus	F	6
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus laevigata	F	5
Crataegus monogyna	R	6
Ilex aquifolium	R	5
Quercus ilex	R	4

Latin Name	DAFOR	Ellenberg value
Quercus petraea	R	4
Rosa sp.	O	N/A
Salix caprea	R	7
Viburnum lantana	R	5
Field layer		
Agrostis capillaris	R	4
Anemone nemorosa	R	4
Angelica sylvestris	R	5
Arum maculatum	R	7
Brachypodium sylvaticum	R	5
Carex pendula	R	6
Carex remota	R	6
Carex sylvatica	O	5
Circaea lutetiana	O	6
Deschampsia cespitosa	R	4
Dryopteris dilatata	F	5
Dryopteris filix-mas	O	5
Euphorbia amygdaloides	R	6
Fragaria × ananassa	O	N/A
Fragaria vesca	R	4
Geranium robertianum	O	6
Geum urbanum	O	7
Hedera helix	O	6
Heracleum sphondylium	O	7
Hyacinthoides non-scripta	O	6
Lonicera nitida	R	N/A
Mercurialis perennis	R	7
Phyllitis scolopendrium	R	5
Poa trivialis	F	6
Prunella vulgaris	R	4
Rubus fruticosus	F-LA	6
Rumex sanguineus	O	7
Taraxacum officinale agg.	R	6
Urtica dioica	R	8
Veronica montana	O	6
Vicia sepium	R	6
Viola sp.	R	N/A

A.17.6 Transect in Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	O	4
Castanea sativa	A	5
Fraxinus excelsior	O	6
Quercus petraea	F	4

Latin Name	DAFOR	Ellenberg value
Understorey		
Rosa sp.	O	N/A
Acer campestre	O	6
Carpinus betulus	A	6
Clematis vitalba	R	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus laevigata	F	5
Crataegus monogyna	O	6
Ilex aquifolium	O	5
Ligustrum vulgare	R	5
Lonicera periclymenum	O	5
Prunus avium	F	6
Rhamnus cathartica	R	6
Sambucus nigra	O	7
Taxus baccata	R	5
Field layer		
Anemone nemorosa	R	4
Anthriscus sylvestris	O	7
Brachypodium sylvaticum	O	5
Carex sylvatica	O	5
Circaea lutetiana	F	6
Cotoneaster horizontalis	O	4
Deschampsia cespitosa	R	4
Dryopteris dilatata	F	5
Dryopteris filix-mas	O	5
Euphorbia amygdaloides	R	6
Fragaria × ananassa	O	N/A
Galium aparine	R	8
Galium odoratum	F	6
Geranium robertianum	O	6
Geum urbanum	O	7
Glechoma hederacea	O	7
Hedera helix	O	6
Heracleum sphondylium	O	7
Hyacinthoides non-scripta	F	6
Lamiastrum galeobdolon	R	6
Lamiastrum galeobdolon	R	6
Melica uniflora	R	5
Mercurialis perennis	F	7
Milium effusum	R	5
Poa trivialis	F	6
Primula vulgaris	O	4
Prunus laurocerasus	O	6
Pteridium aquilinum	R	3
Quercus sp.	O	N/A

Latin Name	DAFOR	Ellenberg value
Reynoutria japonica	O	N/A
Rubus fruticosus	A	6
Rumex sanguineus	O	7
Stachys sylvatica	O	8
Stellaria holostea	O	6
Symphoricarpos albus	O	7
Tamus communis	O	6
Urtica dioica	R	8
Veronica chamaedrys	O	5
Vicia sativa	O	4
Vinca minor	F	7

A.17.7 Quadrat 4 in Habitat parcel 4

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	10	5
Understorey		
Carpinus betulus	7	6
Crataegus laevigata	3	5
Rosa sp.	3	N/A
Field layer		
Hedera helix		6
Hyacinthoides non-scripta	3	6
Rubus fruticosus	4	6

A.17.8 Transect in Habitat parcel 5

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	F	4
Castanea sativa	A	5
Carpinus betulus	A	
Fraxinus excelsior	O	6
Quercus robur	O	4
Understorey		
Acer campestre	O	6
Acer pseudoplatanus	O	6
Carpinus betulus	F	6
Corylus avellana	O	6
Crataegus laevigata	O	5
Ilex aquifolium	O	5
Ligustrum ovalifolium	R	8
Lonicera nitida	O	N/A
Lonicera periclymenum	R	5
Prunus avium	R	6
Prunus laurocerasus	R	6

Latin Name	DAFOR	Ellenberg value
Rubus idaeus	R	5
Ulmus sp.	R	N/A
Field layer		
Arum maculatum	R	7
Dryopteris filix-mas	O	5
Geum urbanum	O	7
Hedera helix	A	6
Hyacinthoides non-scripta	A	6
Mercurialis perennis	F	7
Rosa arvensis	R	5
Rubus fruticosus	A	6
Stachys sylvatica	O	8
Tamus communis	O	6

A.17.9 Quadrat 5 in Habitat parcel 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	2	6
Betula pendula	1	4
Castanea sativa	7	5
Fraxinus excelsior	2	6
Quercus robur	3	4
Understorey		
Acer campestre	1	6
Carpinus betulus	7	6
Corylus avellana	2	6
Crataegus laevigata	2	5
Ilex aquifolium	2	5
Ligustrum ovalifolium	1	8
Lonicera nitida	2	#N/A
Lonicera periclymenum	2	5
Prunus avium	2	6
Prunus laurocerasus	1	6
Rubus idaeus	1	5
Ulmus sp.	1	#N/A
Field layer		
Castanea sativa	1	5
Fraxinus excelsior	1	6
Geum urbanum	3	7
Hedera helix	8	6
Hyacinthoides non-scripta	1	6
Rosa arvensis	3	5
Rubus fruticosus	7	6

A.17.11 Condition assessment: Habitat parcel 1 at 228_AW

Woodland criteria	Score	Comments
1	3	
2	3	
3	1	
4	3	
5	2	
6	1	
7	2	
8	3	
9	3	
10	2	
11	1	
12	2	
13	2	
Total:	28 (Moderate)	

A.17.12 Condition assessment: Habitat parcel 2 at 227_AW

Woodland criteria	Score	Comments
1	3	
2	2	
3	1	
4	3	
5	3	
6	1	
7	2	
8	3	
9	3	
10	1	
11	1	
12	2	
13	1	
Total:	26 (Moderate)	

A.17.13 Condition assessment: Habitat parcel 3 at 307_AW

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	
5	1	
6	1	
7	3	
8	3	
9	3	
10	2	
11	2	
12	2	

Woodland criteria	Score	Comments
13	3	
Total:	32 (Moderate)	

A.17.14 Condition assessment: Habitat parcel 4 at 307_AW

Woodland criteria	Score	Comments
1	2	
2	2	
3	1	
4	3	
5	3	
6	2	
7	3	
8	3	
9	3	
10	3	
11	1	Assuming young sweet chestnut growing from an ancient stool is classified as young rather than a veteran tree
12	1	
13	2	
Total:	30 (Moderate)	

A.17.15 Condition assessment: Habitat parcel 5 at 225_AW

Woodland criteria	Score	Comments
1	2	None over 150 years old
2	3	
3	1	
4	3	
5	2	
6	3	Some open space from split/fallen old coppice
7	2	
8	2	Ash dieback
9	2	Ground layer akin to W10
10	3	Very varied structure
11	1	
12	3	
13	3	
Total:	30 (Moderate)	

A.17.16 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 Presence of cherry laurel regeneration	 Varied tree ages including mature sweet chestnut tree amongst sparse ground flora
Photograph 3	**Photograph 4**
 Sparse ground layer next to cleared woodland path	 Norway maple sapling regeneration

Photograph 5	Photograph 6
 Area of cleared, compacted ground within woodland	 Ground layer of woodland
Photograph 7	**Photograph 8**
 Presence of cherry laurel	 Trees of varying age classes in woodland

Photograph 9	Photograph 10
 Sparse ground flora	 Area of raised earth, possibly indicating past management and/or previous location of hedgerow within woodland

A.18 Great Crabbles Wood AW

A.18.1 Habitat Parcel 1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy (woodland)		
Fraxinus excelsior	A	6
Carpinus betulus	A	6
Castanea sativa	A	5
Quercus robur	R	4
Betula pendula	R	4
Understorey		
Ligustrum vulgare	R	5
Corylus avellana	R	6
Sambucus nigra	O	7
Crataegus monogyna	O	6
Ulmus sp.	R	N/A
Acer campestre	O	6
Rubus fruticosus	O	6
Rosa arvensis	R	5
Cornus sanguinea	R	6
Euonymus europaeus	R	5

Latin Name	DAFOR	Ellenberg value
Ruscus aculeatus	R	4
Viburnum lantana	R	5
Ilex aquifolium	R	5
Viburnum opulus	R	6
Prunus cerasifera	R	6
Clematis vitalba	O	5
Field layer		
Euphorbia amygdaloides	O	6
Iris foetidissima	O	5
Hyacinthoides non-scripta	A	6
Mercurialis perennis	A	7
Alliaria petiolata	F	8
Brachypodium sylvaticum	O	5
Geum urbanum	O	7
Arum maculatum	F	7
Veronica chamaedrys	O	5
Galium aparine	O	8
Anemone nemorosa	R	4
Hypericum hirsutum	R	5
Urtica dioica	R	8
Glechoma hederacea	R	7
Carex sylvatica	O	5
Taraxacum officinale agg.	R	6
Senecio jacobaea	R	4
Circaea lutetiana	O	6
Poa nemoralis	A	5
Adoxa moschatellina	O	5
Orchis mascula	O	4
Viola odorata	O	7
Rumex sanguineus	R	7
Ficaria verna	O	6
Dryopteris dilatata	R	5
Pteridium aquilinum	R	3
Poa trivialis	F	6
Hedera helix	R	6

A.18.2 Habitat Parcel 1 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	7	6
Carpinus betulus	7	6
Castanea sativa	7	5

Latin Name	DOMIN	Ellenberg value
Quercus robur	4	4
Betula pendula	1	4
Understorey		
Corylus avellana	2	6
Acer campestre	1	6
Ulmus sp.	1	N/A
Ruscus aculeatus	1	4
Euonymus europaeus	1	5
Field layer		
Mercurialis perennis	9	7
Hyacinthoides non-scripta	5	6
Kindbergia praelonga	4	5
Geum urbanum	3	7
Dryopteris filix-mas	1	5
Brachythecium rutabulum	1	8
Circaea lutetiana	1	6

A.18.3 Great Crabbles Wood AW/SSSI

A.18.4 Condition assessment: Habitat Parcel 1 Transect 1

Woodland criteria	Score	Comments
1	2	Two age classes, young and intermediate.
2	3	
3	3	
4	3	
5	3	Mainly native.
6	1	Very little open space.
7	2	Some regeneration.
8	2	Some ash dieback.
9	3	
10	2	Generally, two storeys.
11	1	
12	2	
13	3	
Total:	30 (Moderate)	

A.18.5 Additional condition assessment notes: None

Photograph 1

Collected fallen deadwood on woodland border adjacent to road

A.19 Great Crabbles Wood SSSI

A.19.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy (woodland)		
Fraxinus excelsior	A	6
Carpinus betulus	A	6
Castanea sativa	A	5
Quercus robur	R	4
Betula pendula	R	4
Understorey		
Ligustrum vulgare	R	5
Corylus avellana	R	6
Sambucus nigra	O	7
Crataegus monogyna	O	6
Ulmus sp.	R	N/A
Acer campestre	O	6
Rubus fruticosus	O	6
Rosa arvensis	R	5
Cornus sanguinea	R	6
Euonymus europaeus	R	5
Ruscus aculeatus	R	4
Viburnum lantana	R	5
Ilex aquifolium	R	5
Viburnum opulus	R	6
Prunus cerasifera	R	6
Clematis vitalba	O	5
Field layer		
Euphorbia amygdaloides	O	6
Iris foetidissima	O	5
Hyacinthoides non-scripta	A	6
Mercurialis perennis	A	7
Alliaria petiolata	F	8

Latin Name	DAFOR	Ellenberg value
Brachypodium sylvaticum	O	5
Geum urbanum	O	7
Arum maculatum	F	7
Veronica chamaedrys	O	5
Galium aparine	O	8
Anemone nemorosa	R	4
Hypericum hirsutum	R	5
Urtica dioica	R	8
Glechoma hederacea	R	7
Carex sylvatica	O	5
Taraxacum officinale agg.	R	6
Senecio jacobaea	R	4
Circaea lutetiana	O	6
Poa nemoralis	A	5
Adoxa moschatellina	O	5
Orchis mascula	O	4
Viola odorata	O	7
Rumex sanguineus	R	7
Ficaria verna	O	6
Dryopteris dilatata	R	5
Pteridium aquilinum	R	3
Poa trivialis	F	6
Hedera helix	R	6

A.19.2 Quadrat 1(Q1)

Latin Name	DAFOR	Layer	Ellenberg value
Canopy			
Fraxinus excelsior	7	Canopy	6
Carpinus betulus	7	Canopy	6
Castanea sativa	7	Canopy	5
Quercus robur	4	Canopy	4
Betula pendula	1	Canopy	4
Understorey			
Corylus avellana	2	Understorey	6
Acer campestre	1	Understorey	6
Ulmus sp.	1	Understorey	N/A
Ruscus aculeatus	1	Understorey	4
Euonymus europaeus	1	Understorey	5
Field layer			**#N/A**
Mercurialis perennis	9	Field	7
Hyacinthoides non-scripta	5	Field	6
Kindbergia praelonga	4	Field	5
Geum urbanum	3	Field	7
Dryopteris filix-mas	1	Field	5
Brachythecium rutabulum	1	Field	8
Circaea lutetiana	1	Field	6

A.19.3 Great Crabbles Wood AW/SSSI

A.19.4 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	Two age classes, young and intermediate.
2	3	
3	3	
4	3	
5	3	Mainly native.
6	1	Very little open space.
7	2	Some regeneration.
8	2	Some ash dieback.
9	3	
10	2	Generally, two storeys.
11	1	
12	2	
13	3	
Total:	30 (Moderate)	

A.19.5 Additional condition assessment notes: None

Photograph 1

Collected fallen deadwood on woodland border adjacent to road

A.20 Halling to Trottiscliffe Escarpment SSSI

A.20.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	F	6
Carpinus betulus	O	6
Fraxinus excelsior	O	6
Quercus robur	F	4
Understorey		

Latin Name	DAFOR	Ellenberg value
Acer pseudoplatanus	O	6
Castanea sativa	R	5
Clematis vitalba	F	5
Cornus sanguinea	O	6
Corylus avellana	O	6
Crataegus monogyna	F	6
Euonymus europaeus	F	5
Ligustrum vulgare	O	5
Prunus avium	R	6
Prunus spinosa	R	6
Rosa canina	R	6
Taxus baccata	F	5
Viburnum lantana	O	5
Field layer		
Acer campestre	O	6
Brachypodium sylvaticum	F	5
Carex sylvatica	R	5
Cornus sanguinea	O	6
Daphne laureola	R	5
Fragaria vesca	R	4
Fraxinus excelsior	O	6
Hedera helix	F	6
Iris foetidissima	R	5
Ligustrum vulgare	O	5
Prunus spinosa	R	6
Rubus fruticosus	O	6
Sanicula europaea	R	5
Taxus baccata	O	5

A.20.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	7	6
Carpinus betulus	4	6
Fraxinus excelsior	4	6
Quercus robur	2	4
Understorey		
Acer pseudoplatanus	1	6
Castanea sativa	1	5
Clematis vitalba	2	5
Cornus sanguinea	4	6
Corylus avellana	1	6
Crataegus monogyna	7	6
Euonymus europaeus	2	5
Ligustrum vulgare	1	5
Prunus avium	1	6
Prunus spinosa	1	6
Rosa canina	1	6
Taxus baccata	4	5
Viburnum lantana	1	5

Latin Name	DOMIN	Ellenberg value
Field layer		
Cornus sanguinea	2	6
Hedera helix	8	6
Ligustrum vulgare	2	5
Rubus fruticosus	1	6
Viburnum lantana	1	5

A.20.3 Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Understorey		
Betula pendula	O	4
Castanea sativa	R	5
Cornus sanguinea	R	6
Corylus avellana	R	6
Ilex aquifolium	R	5
Ligustrum vulgare	R	5
Pinus sylvestris	R	2
Rosa sp.	R	N/A
Sorbus aria	O	4
Taxus baccata	O	5
Viburnum lantana	R	5
Field layer		
Arrhenatherum elatius	O	7
Blackstonia perfoliata	O	2
Briza media	F	3
Bromopsis erecta	F	3
Carex flacca	O	2
Carlina vulgaris	O	2
Centaurea nigra	O	5
Centaurea scabiosa	R	3
Cirsium acaule	O	3
Clematis vitalba	O	5
Cotoneaster bullatus	R	4
Cotoneaster horizontalis	R	4
Crepis sp.	O	N/A
Daucus carota	F	8
Diplotaxis tenuifolia	R	6
Echium vulgare	O	4
Euphrasia sp.	F	N/A
Festuca ovina	O	2
Galium mollugo	R	4
Gentianella amarella	O	2
Hypericum perforatum	O	5
Leontodon hispidus	R	3
Linum catharticum	O	2
Lotus corniculatus	F	2
Origanum vulgare	F	4
Picris hieracioides	O	3
Pilosella officinarum	O	2
Plantago lanceolata	O	4

Latin Name	DAFOR	Ellenberg value
Polygala vulgaris	R	3
Quercus sp.	R	N/A
Sanguisorba minor	F	3
Scabiosa columbaria	F	2
Trifolium pratense	O	5

A.20.4 Habitat parcel 2 Quadrat 2

Latin Name	DOMIN	Ellenberg value
Field layer		
Carex flacca	2	2
Blackstonia perfoliata	2	2
Briza media	4	3
Bromopsis erecta	5	3
Cirsium acaule	2	3
Daucus carota	3	8
Euphrasia sp.	2	N/A
Festuca ovina	4	2
Gentianella amarella	1	2
Hedera helix	1	6
Hypericum perforatum	1	5
Linum catharticum	2	2
Lotus corniculatus	4	2
Orchis sp.	1	N/A
Origanum vulgare	4	4
Picris hieracioides	1	3
Pilosella officinarum	3	2
Polygala vulgaris	1	3
Rosa sp.	2	N/A
Sanguisorba minor	4	3
Scabiosa columbaria	3	2

A.20.5 Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	A	6
Betula pendula	O	4
Fraxinus excelsior	R	6
Understorey		
Acer campestre	F	6
Buddleja sp.	R	N/A
Cornus sanguinea	O	6
Corylus avellana	F	6
Crataegus monogyna	F	6
Ilex aquifolium	O	5
Salix caprea	R	7
Sambucus nigra	O	7
Taxus baccata	O	5
Field layer		

Latin Name	DAFOR	Ellenberg value
Acer pseudoplatanus	F	6
Ajuga reptans	R	5
Alliaria petiolata	R	8
Arum maculatum	O	7
Ballota nigra	R	6
Carpinus betulus	R	6
Chamerion angustifolium	R	5
Circaea lutetiana	F	6
Conyza canadensis	O	6
Crataegus monogyna	O	6
Dryopteris filix-mas	F	5
Fragaria vesca	R	4
Galium odoratum	O	6
Geranium robertianum	F	6
Geum urbanum	O	7
Hedera helix	F	6
Hypericum hirsutum	O	5
Ilex aquifolium	O	5
Iris foetidissima	O	5
Ligustrum vulgare	O	5
Mercurialis annua	R	7
Mercurialis perennis	F	7
Phyllitis scolopendrium	F	5
Ribes uva-crispa	O	6
Rubus fruticosus	F	6
Sanicula europaea	R	5
Scrophularia umbrosa	R	7
Sonchus oleraceus	R	7
Tamus communis	O	6
Taraxacum officinale agg.	R	6
Urtica dioica	O	8
Veronica chamaedrys	O	5
Viburnum lantana	O	5

A.20.6 Habitat parcel 3 Quadrat 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	9	6
Betula pendula	1	4
Fraxinus excelsior	3	6
Understorey		
Acer campestre	4	6
Acer pseudoplatanus	5	6
Cornus sanguinea	1	6
Corylus avellana	2	6
Crataegus monogyna	2	6
Ilex aquifolium	1	5
Salix caprea	1	7
Sambucus nigra	4	7
Taxus baccata	4	5

Latin Name	DOMIN	Ellenberg value
Field layer		
Acer pseudoplatanus	2	6
Crataegus monogyna	2	6
Fraxinus excelsior	1	6
Hedera helix	9	6
Ilex aquifolium	1	5
Mercurialis perennis	4	7
Ribes uva-crispa	1	6
Rubus fruticosus	3	6
Urtica dioica	3	8

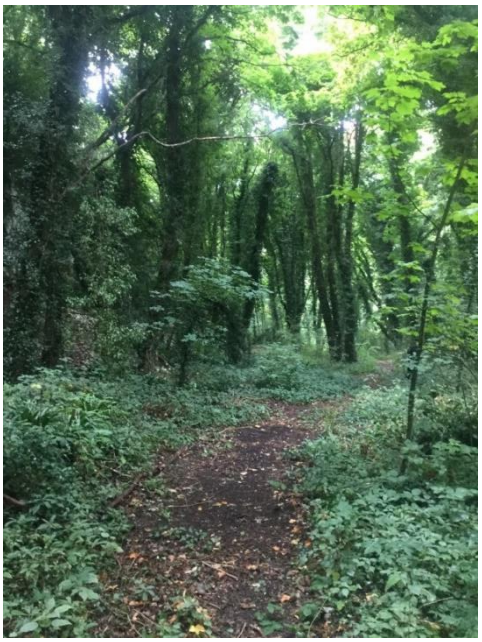
A.20.7 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
7	3	-
8	2	-
9	3	-
10	2	-
11	1	-
12	1	-
13	3	-
Total:	**30 (Moderate)**	

A.20.8 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	1	-
6	3	-
7	3	-
8	2	-
9	3	-
10	2	-
11	1	-
12	3	-
13	2	-
Total:	**31 (Moderate)**	

A.20.9 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 Locally abundant Hart's-tongue fern particularly on bare slopes	 Sycamore dominated canopy with rare ash displaying moderate dieback, and birch, yew, and elder understorey.
Photograph 3	**Photograph 4**
 Steep slopes, gullies and hillocks often covered in dense ivy	 One slope is an active rubbish dump with significant amounts of rubbish moving down the slope to settle at the base

A.21 Hobbs Hole AW (Overlaps with Hobbs Hole LWS)

A.21.1 Habitat parcel 1 Transect 1 (woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	A	4
Fraxinus excelsior	A	6
Populus nigra	R	7
Populus tremula	R	6
Betula pendula	R	4
Understorey		
Prunus cerasifera	A	6
Sambucus nigra	A	7
Acer campestre	O	6
Ligustrum vulgare	F	5
Prunus spinosa	R	6
Field layer		
Silene dioica	F	6
Solanum dulcamar	R	6
Hyacinthoides non-scripta	F	5
Rubus fruticosus	A	8
Dryopteris dilatata	O	7
Galium aparine	A	8
Rumex conglomeratus	R	7
Anthriscus sylvestris	F	7
Rosa canina	R	6
Mercurialis perennis	F	7
Veronica chamaedrys	R	5
Arctium lappa	R	9
Pimpinella major	R	6
Glechoma hederacea	F	7
Stachys sylvatica	R	8
Conium maculatum	R	8
Geranium robertianum	R	6
Heracleum sphondylium	R	7
Hedera helix	F	6
Arum maculatum	R	7
Dryopteris filix-mas	O	5
Adoxa moschatellina	O	5
Urtica dioica	A	8
Carex pendula	R	6
Poa trivialis	F	6
Cirsium vulgare	R	6
Moehringia trinervia	F	6
Geum urbanum	O	7
Brachypodium sylvaticum	O	5

Latin Name	DAFOR	Ellenberg value
Milium effusum	F	5
Lamiastrum galeobdolon	R	6
Holcus lanatus	O	5

A.21.2 Habitat parcel 1 Quadrat 1 (along Transect 1 - woodland)

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	8	6
Quercus robur	5	4
Carpinus betulus	3	6
Understorey		
Prunus cerasifera	5	6
Sambucus nigra	4	7
Crataegus monogyna	2	6
Field layer		
Silene dioica	4	7
Anthriscus sylvestris	5	7
Holcus lanatus	3	5
Poa trivialis	6	6
Geum urbanum	2	7
Urtica dioica	3	8
Galium aparine	4	8
Mercurialis perennis	4	7
Glechoma hederacea	5	7
Brachypodium sylvaticum	2	5
Hedera helix	2	6
Hyacinthoides non-scripta	5	6
Stachys sylvatica	4	8
Alliaria petiolata	1	8

A.21.3 Habitat parcel 2 Quadrat 2 (along Transect 2 - woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	2	4
Populus tremula	2	6
Quercus robur	7	4
Fraxinus excelsior	7	6
Acer campestre	2	6
Understorey		
Ligustrum vulgare	2	5
Crataegus monogyna	6	6
Prunus spinosa	4	6
Rosa canina	1	6

Latin Name	DAFOR	Ellenberg value
Sambucus nigra	2	7
Prunus cerasifera	1	6
Field layer		
Urtica dioica	9	8
Galium aparine	9	8
Milium effusum	4	5
Silene dioica	3	7
Ligustrum vulgare	3	5
Glechoma hederacea	5	7
Rubus fruticosus	1	6
Lamiastrum galeobdolon	2	6

A.21.4 Condition assessment: Habitat parcel 1 Transect 1 (woodland)

Woodland criteria	Score	Comments
1	2	Two age classes present
2	3	None seen
3	3	None present
4	3	-
5	2	A lot of cherry plum
6	2	-
7	2	-
8	3	-
9	3	-
10	2	-
11	3	Some big oak and ash with veteran tree characters
12	2	-
13	1	Abundant nettle
Total:	31 (Moderate)	

A.21.5 Condition assessment: Habitat parcel 2 Transect 2 (grassland)

Grassland criteria	Score	Comments
1	No	Too rank with many undesirable species present
2	No	Tall throughout
3	No	No bare ground
4	No	Bramble over 5%
5	No	Combined cover of undesirables well over 50% plus the non-native goat's rue at well over 5%
Total:	Poor	

A.21.6 Additional condition assessment notes: None

Photograph 1	Photograph 2
	
dense nettle in woodland clearing	thick understory and dense ground layer near edge of woodland. Lichens which are not sensitive to nitrogen present on bark

Photograph 3

dense nettle on woodland floor

A.22 Hobbs Hole LWS (overlaps Hobbs Hole AW)

A.22.1 Habitat parcel 1 Transect 1 (woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	A	4
Fraxinus excelsior	A	6
Populus nigra	R	7
Populus tremula	R	6
Betula pendula	R	4
Understorey		
Prunus cerasifera	A	6

Latin Name	DAFOR	Ellenberg value
Sambucus nigra	A	7
Acer campestre	O	6
Ligustrum vulgare	F	5
Prunus spinosa	R	6
Field layer		
Silene dioica	F	6
Solanum dulcamar	R	6
Hyacinthoides non-scripta	F	5
Rubus fruticosus	A	8
Dryopteris dilatata	O	7
Galium aparine	A	8
Rumex conglomeratus	R	7
Anthriscus sylvestris	F	7
Rosa canina	R	6
Mercurialis perennis	F	7
Veronica chamaedrys	R	5
Arctium lappa	R	9
Pimpinella major	R	6
Glechoma hederacea	F	7
Stachys sylvatica	R	8
Conium maculatum	R	8
Geranium robertianum	R	6
Heracleum sphondylium	R	7
Hedera helix	F	6
Arum maculatum	R	7
Dryopteris filix-mas	O	5
Adoxa moschatellina	O	5
Urtica dioica	A	8
Carex pendula	R	6
Poa trivialis	F	6
Cirsium vulgare	R	6
Moehringia trinervia	F	6
Geum urbanum	O	7
Brachypodium sylvaticum	O	5
Milium effusum	F	5
Lamiastrum galeobdolon	R	6
Holcus lanatus	O	5

A.22.2 Habitat parcel 1 Quadrat 1 (along Transect 1 - woodland)

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	8	6
Quercus robur	5	4
Carpinus betulus	3	6
Understorey		

Latin Name	DOMIN	Ellenberg value
Prunus cerasifera	5	6
Sambucus nigra	4	7
Crataegus monogyna	2	6
Field layer		
Silene dioica	4	7
Anthriscus sylvestris	5	7
Holcus lanatus	3	5
Poa trivialis	6	6
Geum urbanum	2	7
Urtica dioica	3	8
Galium aparine	4	8
Mercurialis perennis	4	7
Glechoma hederacea	5	7
Brachypodium sylvaticum	2	5
Hedera helix	2	6
Hyacinthoides non-scripta	5	6
Stachys sylvatica	4	8
Alliaria petiolata	1	8

A.22.3 Habitat parcel 2 Quadrat 2 (along Transect 2 - woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	2	4
Populus tremula	2	6
Quercus robur	7	4
Fraxinus excelsior	7	6
Acer campestre	2	6
Understorey		
Ligustrum vulgare	2	5
Crataegus monogyna	6	6
Prunus spinosa	4	6
Rosa canina	1	6
Sambucus nigra	2	7
Prunus cerasifera	1	6
Field layer		
Urtica dioica	9	8
Galium aparine	9	8
Milium effusum	4	5
Silene dioica	3	7
Ligustrum vulgare	3	5
Glechoma hederacea	5	7
Rubus fruticosus	1	6
Lamiastrum galeobdolon	2	6

A.22.4 Habitat parcel 2Transect 2 (grassland)

Latin Name	DAFOR	Ellenberg value
Understorey		
Cornus sanguinea	O	6
Field layer		
Galega officinalis	A	8
Conium maculatum	F	8
Geranium dissectum	O	6
Cirsium vulgare	F	6
Cirsium arvense	F	6
Ranunculus repens	F	7
Rubus fruticosus	A	6
Rumex conglomeratus	F	7
Leucanthemum vulgare	F	4
Poa trivialis	F	6
Dipsacus fullonum	F	7
Holcus lanatus	F	5
Vicia sativa	O	4
Picris echioides	F	6
Medicago lupulina	F	4
Senecio jacobaea	F	4
Dactylis glomerata	O	6
Picris hieracioides	F	3
Arrhenatherum elatius	O	7
Taraxacum officinale agg.	F	6
Glechoma hederacea	F	7
Myosotis arvensis	O	6
Silene dioica	O	7
Bromus hordeaceus	O	4
Galium aparine	O	8
Arctium lappa	O	9
Rumex obtusifolius	O	9
Sisymbrium officinale	O	7
Heracleum sphondylium	O	7
Malva sp.	R	N/A
Epilobium hirsutum	R	7
Solidago canadensis	O	6
Vicia hirsuta	R	6
Carum carvi	R	N/A

A.22.5 Habitat parcel 2 Quadrat 3 (along transect 2, grassland)

Latin Name	DAFOR	Ellenberg value
Field layer		
Galega officinalis	5	8
Epilobium hirsutum	4	7

Latin Name	DAFOR	Ellenberg value
Leucanthemum vulgare	4	4
Poa trivialis	5	6
Rumex obtusifolius	2	9
Rumex conglomeratus	4	7
Dipsacus fullonum	1	7
Sisymbrium officinale	3	7
Urtica dioica	3	8
Myosotis arvensis	3	6
Silene dioica	1	7
Cirsium arvense	5	6
Galium aparine	3	8
Cirsium vulgare	1	6
Pastinaca sativa	2	5
Heracleum sphondylium	2	7
Arrhenatherum elatius	4	7
Holcus lanatus	4	5
Rubus fruticosus	2	6

A.22.6 Condition assessment: Habitat parcel 1 Transect 1 (woodland)

Woodland criteria	Score	Comments
1	2	Two age classes present
2	3	None seen
3	3	None present
4	3	-
5	2	A lot of cherry plum
6	2	-
7	2	-
8	3	-
9	3	-
10	2	-
11	3	Some big oak and ash with veteran tree characters
12	2	-
13	1	Abundant nettle
Total:	31 (Moderate)	

A.22.7 Condition assessment: Habitat parcel 2 Transect 2 (grassland)

Grassland criteria	Score	Comments
1	No	Too rank with many undesirable species present
2	No	Tall throughout
3	No	No bare ground
4	No	Bramble over 5%
5	No	Combined cover of undesirables well over 50% plus the non-native goat's rue at well over 5%
Total:	Poor	

A.22.8 Additional condition assessment notes: None

Photograph 1	Photograph 2
	
dense nettle in woodland clearing	thick understory and dense ground layer near edge of woodland. Lichens which are not sensitive to nitrogen present on bark
Photograph 3	**Photograph 4**
	
dense nettle on woodland floor	Area of grassland adjacent to woodland with dense nettle, goats' rue, and some scattered scrub

A.23 Impton/Podkin Woods AW and Frith Woods Etc., Kit's Coty LWS

A.23.1 Transect in Habitat parcel 1 (parallel to M2)

Latin Name	DAFOR	Ellenberg value
Canopy		
Fagus sylvatica	R	5
Betula pendula	O	4
Carpinus betulus	O	6
Fraxinus excelsior	A	6

Latin Name	DAFOR	Ellenberg value
Quercus robur	A	4
Castanea sativa	A	5
Fagus sylvatica	O	5
Sorbus aucuparia	R	4
Prunus avium	O	6
Understorey		
Ilex aquifolium	R	5
Crataegus monogyna	F	6
Ligustrum vulgare	O	5
Prunus spinosa	R	6
Corylus avellana	F	6
Acer campestre	F	6
Viburnum lantana	O	5
Euonymus europaeus	O	5
Crataegus laevigata	O	5
Ribes rubrum	R	6
Taxus baccata	R	5
Prunus laurocerasus	R	6
Crataegus monogyna	F	6
Field layer		
Hyacinthoides non-scripta	A	6
Hedera helix	O	6
Rubus fruticosus	A	6
Alliaria petiolata	O	8
Vicia sepium	O	6
Rumex sanguineus	O	7
Poa trivialis	A	6
Veronica montana	A	6
Deschampsia cespitosa	F	4
Anthriscus sylvestris	O	7
Clematis vitalba	O	5
Lonicera periclymenum	O	5
Tamus communis	R	6
Dryopteris dilatata	F	5
Stellaria holostea	O	6
Circaea lutetiana	F	6
Geum urbanum	O	7
Geranium robertianum	O	6
Carex sylvatica	F	5
Rosa arvensis	O	5
Lamiastrum galeobdolon	F	6
Brachypodium sylvaticum	O	5
Heracleum sphondylium	R	7
Chamerion angustifolium	R	5
Stachys sylvatica	F	8
Mercurialis perennis	O	7

Latin Name	DAFOR	Ellenberg value
Viola sp.	O	N/A
Lysimachia nemorum	R	5
Milium effusum	R	5
Ajuga reptans	R	5

A.23.2 Quadrat 1 in Habitat parcel 1 (roadside quadrat, within LWS boundary)

Latin Name	DOMIN	Ellenberg value
Canopy		
Betula pendula	2	4
Castanea sativa	1	5
Fraxinus excelsior	7	6
Fagus sylvatica	3	5
Carpinus betulus	1	6
Sorbus aucuparia	1	4
Understorey		
Crataegus monogyna	4	6
Corylus avellana	5	6
Viburnum lantana	2	5
Euonymus europaeus	3	5
Field layer		
Rubus fruticosus	5	6
Lonicera periclymenum	2	5
Fraxinus excelsior	1	6
Acer campestre	1	6
Tamus communis	1	6

A.23.3 Quadrate 2 in Habitat parcel 1 (established woodland)

Canopy		
Betula pendula	1	4
Castanea sativa	7	5
Fraxinus excelsior	5	6
Carpinus betulus	3	6
Quercus robur	6	4
Understorey		
Crataegus monogyna	1	6
Corylus avellana	3	6
Acer campestre	3	6
Crataegus laevigata	2	5
Field layer		

Rubus fruticosus	7	6
Lonicera periclymenum	1	5
Fraxinus excelsior	2	6
Acer campestre	1	6
Dryopteris dilatata	4	5
Carex sylvatica	3	5
Geranium robertianum	2	6
Lamiastrum galeobdolon	2	6
Rumex sanguineus	1	7
Hyacinthoides non-scripta	3	6
Deschampsia cespitosa	1	4
Poa trivialis	2	6
Stellaria holostea	2	6
Circaea lutetiana	1	6
Alliaria petiolata	1	8

A.23.4 Condition assessment: Habitat parcel 1 Quadrat 1 (roadside woodland)

Woodland criteria	Score	Comments
1	1	
2	3	
3	3	
4	3	
5	3	
6	3	No open space but less than 10ha
7	2	
8	2	
9	1	
10	1	
11	1	
12	1	
13	3	
Total:	27 (Moderate)	

A.23.5 Condition assessment: Habitat parcel 1 Quadrat 2 (established woodland)

Woodland criteria	Score	Comments
1	2	
2	3	
3	2	
4	3	
5	2	
6	3	
7	3	
8	2	
9	3	
10	2	
11	1	
12	3	

Woodland criteria	Score	Comments
13	3	
Total:	32 (Moderate)	

A.23.6 Condition assessment: Habitat parcel 2

Woodland criteria	Score	Comments
1	2	
2	3	
3	2	
4	3	
5	2	
6	3	
7	3	
8	1	Ash dieback
9	3	
10	1	
11	1	
12	2	
13	3	
Total:	29 (Moderate)	

A.23.7 Additional condition assessment notes:

Photograph 1	Photograph 2
	
Roadside woodland much more established in this 15 metre stretch of woodland.	Cherry Laurel

Photograph 3	Photograph 4
	
Rest of woodland compared to road side woodland	Plantation of trees on roadside verge with tree protectors

A.24 Ingrebourne Valley SINC

A.24.1 Transect in Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	O	6
Fraxinus excelsior	R	6
Quercus robur	O	4
Understorey		
Crataegus monogyna	F	6
Euonymus europaeus	R	5
Prunus spinosa	F	6
Rosa sp.	O	N/A
Sambucus nigra	O	7
Field layer		
Galium aparine	O	8
Hedera helix	O	6
Rubus fruticosus	F	6
Silene dioica	O	7
Urtica dioica	F	8

A.24.2 Quadrat in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	4	6
Quercus robur	2	4
Understorey		
Crataegus monogyna	8	6
Prunus spinosa	6	6
Sambucus nigra	4	7
Field layer		
Galium aparine	3	8
Hedera helix	2	6
Rubus fruticosus	4	6
Silene dioica	3	7
Urtica dioica	5	8

A.24.3 Transect in Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Field layer		
Achillea millefolium	LF	4
Agrostis capillaris	F	4
Alopecurus geniculatus	R	6
Anthoxanthum odoratum	F to LD	3
Apium nodiflorum	R	7
Arctium lappa	O	9
Centaurea nigra	LF	5
Cirsium vulgare	R	6
Cynosurus cristatus	F	4
Daucus carota	O	8
Dipsacus fullonum	R	7
Equisetum arvense	R	6
Festuca rubra	O	5
Glyceria fluitans	R	6
Holcus lanatus	F	5
Leontodon hispidus	F	3
Lolium perenne	O	6
Lotus corniculatus	F	2
Lycopus europaeus	R	6
Mentha sp.	R	N/A
Odontites vernus	F	5
Persicaria maculosa	R	7

Latin Name	DAFOR	Ellenberg value
Plantago lanceolata	F	4
Potentilla reptans	O	5
Prunella vulgaris	F	4
Pulicaria dysenterica	R	4
Ranunculus acris	O	4
Ranunculus repens	O	7
Rumex obtusifolius	O	9
Rumex sanguineus	R	7
Scrophularia auriculata	R	7
Senecio jacobaea	F	4
Silene dioica	R	7
Trifolium pratense	R	5
Trifolium repens	O	6
Urtica dioica	LA	8

A.24.4 Quadrat 2 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Field layer		
Achillea millefolium	5	4
Agrostis capillaris	7	4
Leontodon autumnalis	3	4
Leontodon hispidus	4	3
Lolium perenne	2	6
Lotus corniculatus	6	2
Phleum bertolonii	1	4
Plantago lanceolata	6	4
Prunella vulgaris	3	4
Senecio jacobaea	1	4
Trifolium repens	2	6

A.24.5 Quadrat 3 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Field layer		
Agrostis capillaris	4	4
Alopecurus pratensis	2	7
Anthoxanthum odoratum	3	3
Arrhenatherum elatius	7	7
Centaurea nigra	4	5
Crataegus monogyna	1	6
Dactylis glomerata	3	6
Festuca rubra	7	5
Holcus lanatus	4	5
Hypericum perforatum	2	5

Latin Name	DOMIN	Ellenberg value
Quercus robur	2	4
Rosa sp.	1	N/A
Rubus fruticosus	2	6

A.24.6 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	F	6
Fraxinus excelsior	A to D	6
Populus sp.	F	N/A
Quercus robur	R	4
Ulmus glabra	O	6
Understorey		
Carpinus betulus	R	6
Corylus avellana	R	6
Crataegus monogyna	A	6
Prunus spinosa	R	6
Salix sp.	R	N/A
Sambucus nigra	F	7
Field layer		
Alliaria petiolata	R	8
Allium ursinum	F_LD	7
Angelica sylvestris	R	5
Anthriscus sylvestris	R	7
Arum maculatum	O	7
Brachypodium sylvaticum	O	5
Circaea lutetiana	F	6
Dryopteris filix-mas	O	5
Epilobium sp.	R	N/A
Equisetum arvense	R	6
Festuca gigantea	R	7
Fraxinus excelsior	O	6
Galium aparine	R	8
Geranium robertianum	R	6
Geum urbanum	O	7
Glechoma hederacea	O	7
Hedera helix	F	6
Heracleum sphondylium	R	7
Impatiens glandulifera	O	7
Lamiastrum galeobdolon	R	6
Mercurialis perennis	F	7
Phyllitis scolopendrium	R	5

Latin Name	DAFOR	Ellenberg value
Prunus spinosa	R	6
Rubus fruticosus	F	6
Rumex sanguineus	R	7
Silene dioica	R	7
Stachys sylvatica	R	8
Urtica dioica	F	8

A.24.7 Quadrat 4 in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	6	6
Fraxinus excelsior	7	6
Populus sp	3	N/A
Quercus robur	2	4
Ulmus glabra	4	6
Understorey		
Carpinus betulus	3	6
Corylus avellana	3	6
Crataegus monogyna	7	6
Prunus spinosa	2	6
Salix sp	2	N/A
Sambucus nigra	6	7
Field layer		
Allium ursinum	8	7
Crataegus monogyna	1	6
Dryopteris filix-mas	1	5
Festuca gigantea	2	7
Fraxinus excelsior	2	6
Geum urbanum	3	7
Hedera helix	2	6
Heracleum sphondylium	1	7
Rosa sp	1	N/A
Rubus fruticosus	4	6
Rumex sanguineus	2	7
Urtica dioica	2	8

A.24.8 Condition assessment: Habitat parcel 1

Scrub criteria	Score	Comments
1	Yes	Diverse
2	No	Even aged
3	Yes	-
4	Yes	-
5	No	-
Total:	Moderate	

A.24.9 Condition assessment: Habitat parcel 2

Grassland criteria	Score	Comments
1	Yes	Quite Diverse
2	No	Too heavily grazed
3	Yes	No bare ground
4	Yes	-
5	Yes	-
6	Yes	-
Total:	Good	

A.24.10 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	2	A little bit of *Impatiens glandulifera*
4	3	-
5	3	-
6	3	No open space but less than 10ha
7	3	-
8	2	Some ash dieback
9	2	-
10	2	-
11	1	-
12	3	-
13	3	Some nettle but typical of streamsides and never dominant
Total:	32 (Moderate)	

Additional condition assessment notes: None

Photograph 1

Very bare woodland ground among stands of semi mature trees

A.25 Jermains Wood SINC

A.25.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Understorey		
Acer campestre	O	6
Cornus sanguinea	F-LA	6
Corylus avellana	R	6
Crataegus monogyna	F-LA	6
Fraxinus excelsior	O	6
Prunus avium	R	6
Prunus spinosa	O	6
Quercus robur	O	4
Rosa sp.	O	N/A
Salix cinerea	R	5
Salix sp.	R	N/A
Ulex europaeus	R	3
Ulmus sp.	R	N/A
Field layer		
Arrhenatherum elatius	O	7
Atriplex patula	R	7
Carex pendula	R	6
Centaurea nigra	R	5
Cirsium arvense	O	6
Daucus carota	R	8
Dipsacus fullonum	O	7
Epilobium hirsutum	F-LA	7

Latin Name	DAFOR	Ellenberg value
Galega officinalis	F	8
Heracleum sphondylium	R	7
Holcus lanatus	O	5
Petroselinum segetum	R	6
Phleum pratense	R	6
Picris hieracioides	R	3
Plantago major	R	7
Polygonum aviculare	R	7
Pulicaria dysenterica	F-LA	4
Rubus fruticosus	F-LA	6
Rumex sanguineus	O	7
Urtica dioica	R	8

A.25.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Understorey		
Acer campestre	3	6
Cornus sanguinea	6	6
Corylus avellana	3	6
Crataegus monogyna	6	6
Fraxinus excelsior	4	6
Prunus avium	1	6
Prunus spinosa	5	6
Quercus robur	4	4
Rosa sp.	3	N/A
Salix cinerea	1	5
Salix sp.	3	N/A
Ulex europaeus	2	3
Ulmus sp.	2	N/A
Field layer		
Arrhenatherum elatius	3	7
Atriplex patula	1	7
Carex pendula	1	6
Centaurea nigra	2	5
Cirsium arvense	4	6
Daucus carota	1	8
Dipsacus fullonum	3	7
Epilobium hirsutum	4	7
Galega officinalis	5	8
Heracleum sphondylium	2	7
Holcus lanatus	3	5
Petroselinum segetum	1	6
Phleum pratense	2	6
Picris hieracioides	2	3
Plantago major	1	7
Polygonum aviculare	1	7
Pulicaria dysenterica	5	4
Rubus fruticosus	7	6
Rumex sanguineus	3	7
Urtica dioica	2	8

A.25.3 Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	A	6
Quercus robur	F	4
Acer pseudoplatanus	F	6
Carpinus betulus	A	6
Understorey		
Acer campestre	F	6
Castanea sativa	R	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Ligustrum vulgare	F	5
Prunus spinosa	F	
Ulmus procera	F	6
Field layer		
Acer campestre	O	6
Acer pseudoplatanus	O	6
Agrostis stolonifera	R	6
Arum maculatum	R	7
Brachypodium sylvaticum	R	5
Dryopteris filix-mas	R	5
Fraxinus excelsior	F	6
Geum urbanum	O	7
Glechoma hederacea	O	7
Hyacinthoides non-scripta	F	6
Mercurialis perennis	F-LA	7
Rubus fruticosus	O	6
Rumex sanguineus	R	7
Silene dioica	R	7
Ulmus sp.	O	N/A
Urtica dioica	O	8

A.25.4 Quadrat 2 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Carpinus betulus	7	6
Fraxinus excelsior	7	6
Quercus robur	4	4
Understorey		
Acer pseudoplatanus	4	6
Ligustrum vulgare	6	5
Sambucus nigra	3	7
Ulmus sp.	4	N/A

Latin Name	DOMIN	Ellenberg value
Field layer		
Acer campestre	2	6
Arum maculatum	1	7
Fraxinus excelsior	4	6
Mercurialis perennis	6	7
Rubus fruticosus	3	6

A.25.5 Condition assessment: Habitat parcel 1

Scrub criteria	Score	Comments
1	Yes	-
2	No	Generally young
3	Yes	-
4	Yes	-
5	Yes	-
Total:	Moderate	

A.25.6 Condition assessment: Habitat parcel 2

Woodland criteria	Score	Comments
1	3	-
2	3	-
3	3	-
4	3	-
5	3	-
6	3	-
7	3	-
8	2	Ash dieback
9	2	W8 may be AWI but so much has been frazzled
10	2	-
11	1	-
12	2	-
13	3	-
Total:	33 (Good)	

Photograph 1	Photograph 2
	
A view of the scrub from the footbridge	Open area with scattered ash showing signs of dieback. Ground layer with many saplings of ash, willow, sycamore amongst great willowherb
Photograph 3	**Photograph 4**
	
Appears to have been tree felling / coppicing in this open area with replanting	Area of tall herb and scattered scrub with abundant fleabane and great willowherb

A.26 Langdon Complex LWS_Langdon Ridge SSSI

A.26.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	R	6
Fraxinus excelsior	A	6
Quercus robur	O	4
Quercus x rosacea	R	N/A
Understorey		
Acer pseudoplatanus	O	6
Carpinus betulus	R	6
Crataegus monogyna	F	6
Euonymus europaeus	R	5
Ilex aquifolium	O	5
Prunus sp.	R	N/A
Prunus spinosa	F	6
Rosa canina	R	6
Sambucus nigra	O	7
Ulmus sp.	R	N/A
Field layer		
Calystegia sepium	R	7
Galium aparine	O	8
Geum urbanum	O	7
Hedera helix	F	6
Rubus fruticosus	F	6
Urtica dioica	O	8

A.26.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	1	6
Fraxinus excelsior	8	6
Quercus robur	4	4
Quercus sp.	1	#N/A
Understorey		
Acer pseudoplatanus	2	6
Carpinus betulus	1	6
Crataegus monogyna	6	6
Euonymus europaeus	2	5
Ilex aquifolium	2	5
Prunus sp.	1	#N/A
Prunus spinosa	4	6
Rosa canina	1	6
Sambucus nigra	1	7
Ulmus sp.	2	#N/A
Field layer		
Crataegus monogyna	2	6
Galium aparine	3	8
Hedera helix	8	6
Rubus fruticosus	8	6

A.26.3 Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	F	6
Understorey		
Prunus cerasifera	O	6
Quercus robur	O	4
Field layer		
Arrhenatherum elatius	O	7
Calystegia sepium	O	7
Centaurea nigra	O	5
Convolvulus arvensis	O	6
Heracleum sphondylium	O	7
Holcus lanatus	O	5
Phleum pratense	O	6
Pteridium aquilinum	A	3
Rubus fruticosus	A	6
Urtica dioica	F	8

A.26.4 Quadrat 2 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Understorey		
Anthriscus sylvestris	1	7
Heracleum sphondylium	2	7
Pteridium aquilinum	2	3
Rubus fruticosus	9	6
Field layer		
Achillea millefolium	2	4
Arrhenatherum elatius	4	7
Calystegia sepium	2	7
Equisetum arvense	1	6
Galium aparine	4	8
Urtica dioica	4	8

A.26.5 Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	A	6
Fraxinus excelsior	A	6
Prunus avium	O	6
Quercus robur	O	4
Sorbus aria	R	4
Understorey		
Crataegus monogyna	F	6
Carpinus betulus	F	6
Cotoneaster franchetti	R	N/A
Prunus cerasifera	O	6
Rhamnus cathartica	R	6
Field layer		
Holcus mollis	F	3
Hyacinthoides non-scripta	R	6
Pteridium aquilinum	F	3
Rubus fruticosus	F - LA	6
Stellaria holostea	O	6

A.26.6 Quadrat 3 in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	3	6
Fraxinus excelsior	7	6
Prunus avium	4	6
Quercus robur	7	4
Sorbus aria	2	4
Understorey		
Crataegus monogyna	4	6
Carpinus betulus	1	6
Cotoneaster franchetti	2	N/A
Prunus cerasifera	1	6
Rhamnus cathartica	2	6
Field layer		
Fraxinus excelsior	1	6
Galium aparine	2	8
Hedera helix	2	6
Hyacinthoides non-scripta	2	6
Urtica dioica	1	8
Veronica chamaedrys	1	5

A.26.7 Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	O	6
Quercus robur	R	4
Understorey		
Acer pseudoplatanus	O	6
Field layer		
Achillea millefolium	F	4
Arrhenatherum elatius	F_LA	7
Cirsium vulgare	R	6
Crepis sp.	R	N/A
Dactylis glomerata	O	6
Dipsacus fullonum	O	7
Festuca rubra	O	5
Heracleum sphondylium	O	7
Plantago lanceolata	O	4
Poa trivialis	O	6
Polygonum aviculare	O	7
Rubus fruticosus	LA	6
Urtica dioica	F	8

A.26.8 Quadrat 4 in Habitat parcel 4

Latin Name	DOMIN	Ellenberg value
Field layer		
Achillea millefolium	2	4
Arrhenatherum elatius	4	7
Crepis sp.	1	N/A
Dactylis glomerata	2	6
Heracleum sphondylium	2	7
Plantago lanceolata	1	4
Poa trivialis	2	6
Polygonum aviculare	1	7
Rubus fruticosus	10	6
Urtica dioica	3	8
Festuca rubra	3	5
Quercus sp.	2	N/A

A.26.9 Habitat parcel 5

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Fraxinus excelsior	F	6
Quercus robur	A	4
Understorey		
Corylus avellana	F	6
Crataegus monogyna	F	6
Ilex aquifolium	R	5
Malus sylvestris	R	6
Prunus spinosa	O	6
Salix caprea	R	7
Sambucus nigra	O	7
Field layer		
Anisantha sterilis	O	7
Calystegia sepium	O	7
Galium aparine	F	8
Glechoma hederacea	R	7
Hedera helix	O	6
Pteridium aquilinum	F	3
Rubus fruticosus	D -LA	6
Stachys sylvatica	R	8
Urtica dioica	A	8

A.26.10 Quadrat 5 in Habitat parcel 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	6	6
Fraxinus excelsior	2	6
Quercus robur	7	4
Understorey		
Corylus avellana	3	6
Crataegus monogyna	4	6
Ilex aquifolium	1	5
Malus sylvestris	1	6
Prunus spinosa	1	6
Salix caprea	1	7
Sambucus nigra	1	7
Field layer		
Galium aparine	5	8
Hedera helix	3	6
Rubus fruticosus	9	6
Urtica dioica	5	8

A.26.11 Condition assessment: Habitat parcel 1

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
7	2	-
8	2	-
9	2	-
10	2	-
11	1	-
12	2	-
13	3	-
Total:	29 (Moderate)	

A.26.12 Additional condition assessment notes: N/A

A.26.13 Condition assessment: Habitat parcel 2

Scrub criteria	Score	Comments
1	No	-
2	No	-
3	Yes	-
4	Yes	-
5	No	-
Total:	Poor	

A.26.14 Additional condition assessment notes: N/A

A.26.15 Condition assessment: Habitat parcel 3

Woodland criteria	Score	Comments
1	1	-
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
7	2	-
8	2	Ash dieback
9	1	-
10	1	-
11	1	-
12	1	-
13	3	-
Total:	25 (Moderate)	

A.26.16 Additional condition assessment notes: N/A

A.26.17 Condition assessment: Habitat parcel 4

Scrub criteria	Score	Comments
1	No	-
2	No	-
3	Yes	-
4	Yes	-
5	Yes	-
Total:	Moderate	

A.26.18 Additional condition assessment notes: N/A

A.26.19 Condition assessment: Habitat parcel 5

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	2	Quite a lot of sycamore
6	3	-
7	2	-
8	2	Ash dieback
9	2	W10
10	2	-
11	1	-
12	3	-
13	1	-
Total:	29 (Moderate)	

A.26.20 Additional condition assessment notes: N/A

A.26.21 Langdon Ridge SSSI: The photographs below are from Langdon Ridge Complex LWS, one of the components of Langdon Ridge SSSI

Photograph 1	Photograph 2
 Habitat parcel 1: dense bramble along the roadside	 Habitat parcel 2: lodged grass within an area of dense bramble, likely caused by a resting mammal (eg fox or deer)
Photograph 3	**Photograph 4**
 Habitat parcel 3: showing sparse ground layer beneath plantation	 Habitat parcel 4: showing grassland and scrub mosaic

Photograph 5	Photograph 6
	
Habitat parcel 5: young trees adjacent to dense roadside scrub	Habitat parcel 5: young trees on edge of woodland

A.27 Leybourne Lakes etc., Snodland LWS

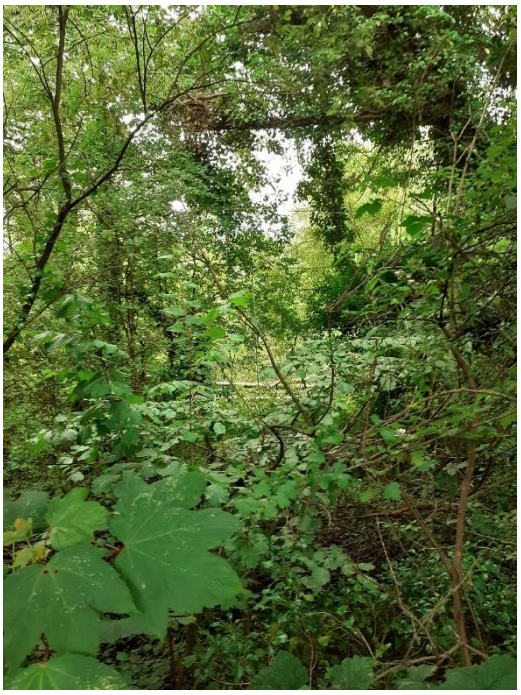
A.27.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	O	6
Fraxinus excelsior	R	6
Castanea sativa	O	5
Understorey		
Corylus avellana	R	6
Crataegus monogyna	R	6
Acer pseudoplatanus	R	6
Ground layer		
Hedera helix	D	6
Rubus fruticosus	F	6
Urtica dioica	F	8
Galium aparine	O	8

A.27.2 Condition assessment:

Woodland criteria	Score	Comments
1	1	-
2	3	-
3	3	-
4	1	-
5	1	-
6	3	-
7	1	-
8	3	-
9	1	-
10	2	-
11	1	-
12	1	-
13	1	-
Total:	22 (Poor)	

A.27.3 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Alder and hawthorn understory	 Dense understory and ground layer with semi mature canopy

A.28 Linford Pit LWS

A.28.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Alnus cordata	O-LA	N/A
Alnus glutinosa	O	6
Alnus incana	A	4
Betula pendula	F	4
Castanea sativa	O	5
Populus tremula	R	6
Populus x canescens	O	5
Quercus robur	O	4
Robinia pseudoacacia	R	6
Salix alba	R	8
Understorey		
Aesculus hippocastanum	R	7
Buddleja davidii	R	5
Crataegus monogyna	R	6
Cytisus scoparius	O	4
Salix caprea	R	7
Salix cinerea	R	5
Sambucus nigra	F	7
Ulex europaeus	O	3
Ulmus minor	O	7
Arum maculatum	R	7
Dryopteris filix-mas	R	5
Echium vulgare	R	4
Galega officinalis	R	8
Galium aparine	F	8
Rosa canina	R	6
Rubus fruticosus	F	6
Urtica dioica	F	8

A.28.2 Quadrat in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Alnus cordata	3	N/A
Alnus glutinosa	3	6
Alnus incana	8	4
Betula pendula	4	4
Castanea sativa	3	5
Quercus robur	3	4
Understorey		
Sambucus nigra	4	7
Field layer		
Galium aparine	7	8
Rubus fruticosus	3	6
Urtica dioica	8	8

A.28.3 Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Alnus cordata	R	N/A
Alnus glutinosa	R	6
Betula pendula	O	4
Carpinus betulus	R	6
Populus tremula	O	6
Prunus avium	F	6
Quercus robur	A	4
Sorbus aucuparia	R	4
Sorbus intermedia	R	7
Understorey		
Acer campestre	O	6
Corylus avellana	F	6
Crataegus monogyna	F	6
Prunus spinosa	R	6
Salix cinerea	R	5
Sambucus nigra	R	7
Ulex europaeus	R	3
Field layer		
Agrostis capillaris	F	4
Brachypodium sylvaticum	R	5
Dryopteris filix-mas	R	5
Epilobium sp.	R	N/A
Festuca rubra	R	5
Galium aparine	F	8
Geum urbanum	F	7
Glechoma hederacea	O	7
Holcus lanatus	F	5
Holcus mollis	O	3
Hyacinthoides non-scripta	R	6
Hypericum perforatum	O	5
Juncus inflexus	R	5
Rubus fruticosus	F	6
Rumex sanguineus	R	7
Urtica dioica	LA	8

A.28.4 Quadrat in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	5	6
Acer platanoides	2	7
Alnus glutinosa	3	6
Carpinus betulus	1	6
Fraxinus excelsior	1	6
Prunus avium	4	6
Quercus robur	7	4
Sorbus aucuparia	2	4
Understorey		

Latin Name	DOMIN	Ellenberg value
Crataegus monogyna	3	6
Field layer		
Acer campestre	3	6
Carpinus betulus	2	6
Crataegus monogyna	2	6
Galium aparine	6	8
Glechoma hederacea	7	7
Rubus fruticosus	6	6
Ulmus sp	2	N/A
Urtica dioica	7	8

A.28.5 Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Field layer		
Acer campestre	R	6
Alcea rosea	R	N/A
Arctium lappa	O	9
Arrhenatherum elatius	F	7
Artemisia vulgaris	O	7
Ballota nigra	O	6
Beta vulgaris	R	8
Calystegia sepium	O	7
Cirsium arvense	F	6
Cirsium vulgare	F-LA	6
Conium maculatum	LA-D	8
Daucus carota	R	8
Dipsacus fullonum	F-LA	7
Erigeron canadensis	O	#N/A
Euphorbia lathyris	R	5
Filago vulgaris	R	4
Galega officinalis	F-LA	8
Heracleum sphondylium	R	7
Holcus lanatus	R	5
Hypericum perforatum	R	5
Iris pseudacorus	R	6
Juncus effusus	R	4
Juncus inflexus	R	5
Mercurialis annua	R	7
Picris echioides	R	6
Picris hieracioides	R	3
Plantago lanceolata	R	4
Plantago major	O	7
Polygonum aviculare	O	7
Potentilla reptans	R	5
Pulicaria dysenterica	F	
Reseda luteola	R	6
Rubus fruticosus	F	6
Rumex conglomeratus	R	7
Rumex obtusifolius	R	9
Rumex sanguineus	O	7

Latin Name	DAFOR	Ellenberg value
Senecio inaequidens	F	N/A
Senecio jacobaea	R	4
Sisymbrium officinale	F-LA	7
Solanum dulcamara	R	7
Tripleurospermum inodorum	O	6
Urtica dioica	F-LA	8

A.28.6 Quadrat in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Field layer		
Arctium lappa	1	9
Armoracia rusticana	1	7
Cirsium vulgare	8	6
Corylus avellana	5	6
Elytrigia repens	1	7
Hypericum perforatum	5	5
Potentilla reptans	5	5
Rumex conglomeratus	1	7
Rumex crispus	4	6
Senecio jacobaea	1	4

A.28.7 Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Understorey		
Acer campestre	R	6
Buddleja davidii	F_A	5
Cornus sanguinea	F_A	6
Ligustrum vulgare	R	5
Populus tremula	LA	6
Field layer		
Rubus fruticosus	F-A	6

A.28.8 No quadrat for Habitat parcel 4 (location not accessible)

A.28.9 Condition assessment: Habitat parcel 1 at 324b_LWS

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	2	-
5	1	-
6	1	-
7	2	-
8	3	Ash dieback
9	1	-
10	2	-
11	1	-
12	2	-
13	2	-
Total:	25 (Poor)	

A.28.10 Additional condition assessment notes: N/A

A.28.11 Condition assessment: Habitat parcel 2 at 324b_LWS

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
7	2	Very few saplings
8	3	-
9	2	Apparently W10
10	1	-
11	1	-
12	1	-
13	3	-
Total:	28 (Moderate)	

A.28.12 **Additional condition assessment notes**: N/A

A.28.13 Condition assessment: Habitat parcel 3 at 324b_LWS

Grassland criteria	Score	Comments
1	No	Vestiges of MG1 due to the presence of. *Arrhenatherum*, but no other plants typical of neutral grassland
2	No	All tall
3	No	Well over 5%

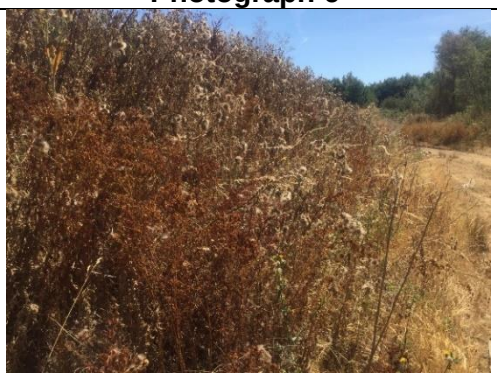
Grassland criteria	Score	Comments
4	Yes	-
5	No	-
6	No	-
Total:	Poor	

A.28.14 Additional condition assessment notes: N/A

A.28.15 Condition assessment: Habitat parcel 4 at 324b_LWS

Woodland criteria	Score	Comments
1	2	Two age classes
2	3	-
3	3	-
4	3	-
5	1	Dominated by sweet chestnut
6	3	-
7	2	Some re growth but mainly from suckering
8	3	-
9	2	Very few indicators but distinctly W10
10	3	-
11	1	-
12	3	Very abundant
13	3	Very limited, restricted to small area at NE end.
Total:	32 (Moderate)	

A.28.16 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 Southern part - broadleaved plantation woodland, together with some oaks which are markedly older than the planted trees	 Most trees and shrubs appear to have been planted about 30 years ago.
Photograph 3	**Photograph 4**
 In the understorey hawthorn and coppiced hazel are frequent and occasional field maple and the ground layer consists of frequent bramble, wood avens, bent and Yorkshire fog.	 Pedunculate oak is dominant in the canopy together with frequent cherry and occasional silver birch
Photograph 5	**Photograph 6**
 Northern part - mature secondary woodland, apparently unmanaged, high forest.	In  the north-easter part tall herb on a series of spoil heaps with frequent false oat grass, but largely dominated by hemlock, with frequent to abundant spear thistle, creeping thistle, hedge mustard, teasel, nettle, and goats' rue.

A.29 Little Chef Pastures SINC

A.29.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Field layer		
Dactylis glomerata	F	6
Arrhenatherum elatius	F	7
Agrostis stolonifera	F	6
Holcus lanatus	F	5
Elytrigia repens	O	7
Senecio jacobaea	O	4
Juncus conglomeratus	R	3
Heracleum sphondylium	R	7
Festuca rubra	O	5
Rumex crispus	O	6
Quercus robur	R	4
Prunus spinosa	O	6
Phleum pratense	O	6
Alopecurus pratensis	F	7
Epilobium hirsutum	O	7
Picris echioides	R	6
Urtica dioica	O	8
Convolvulus arvensis	R	6
Epilobium palustre	R	3
Anthoxanthum odoratum	O	3
Rumex acetosella	O	3
Galium aparine		8

A.29.2 Quadrats 1 and 2

Latin Name	DOMIN	Ellenberg value
Quadrat 1 Field layer		
Poa pratensis	2	5
Dactylis glomerata	6	6
Arrhenatherum elatius	6	7
Alopecurus pratensis	6	7
Elytrigia repens	3	7
Anthoxanthum odoratum	1	3
Prunus spinosa	9	6
Quadrat 2 Field layer		
Hedera helix	9	6
Geum urbanum	3	7
Rubus fruticosus	3	6
Fraxinus excelsior	1	6
Alliaria petiolata	3	8

A.29.3 Condition assessment: Transect 1 (T1)

Grassland criteria	Score	Comments
1	No	Species poor
2	Yes	-
3	Yes	About 1%
4	Yes	Some bramble but less than 5%
5	Yes	-
6	No	-
Total:	Moderate	

A.29.4 Additional condition assessment notes: None

Photograph 1

Unmanaged grassland meadow with small amount of bramble and dock

A.30 AW_Theme_ID_1486937 (Longhoes) AW

A.30.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus petraea	F	4
Fraxinus excelsior	F	6
Sorbus aria	R	4
Quercus robur	R	4
Castanea sativa	F	5
Acer campestre	O	6
Understorey		
Sambucus nigra	O	7
Ligustrum vulgare	O	5

Latin Name	DAFOR	Ellenberg value
Viburnum lantana	R	5
Crataegus monogyna	O	6
Cornus sanguinea	R	6
Euonymus europaeus	R	5
Fraxinus excelsior	O	6
Prunus avium	R	6
Corylus avellana	F	6
Fragaria vesca	R	4
Clematis vitalba	O	5
Anthriscus sylvestris	F and LA	7
Mercurialis perennis	F	7
Hedera helix	O	6
Lamiastrum galeobdolon	R	6
Geum urbanum	O	7
Acer campestre	O	6
Daphne laureola	O	5
Hyacinthoides non-scripta	F	6
Rubus fruticosus	F	6
Brachypodium sylvaticum	R	5
Bromus sterilis	R	7
Galium aparine	O	8
Glechoma hederacea	R	7
Iris foetidissima	R	5
Arum maculatum	O	7
Alliaria petiolata	R	8
Viola reichenbachiana	R	5
Bryonia dioica	R	7
Tamus communis	R	6
Orchis mascula	R	4
Urtica dioica	O	8
Rumex sanguineus	O	7
Poa trivialis	F	6
Circaea lutetiana	R	6
Veronica chamaedrys	R	5
Ficaria verna	R	6
Euphorbia amygdaloides	R	6
Primula vulgaris	R	4
Melica uniflora	R	5
Vicia sepium	R	6
Dactylis glomerata	R	6

Latin Name	DAFOR	Ellenberg value
Lamiastrum galeobdolon	R	6
Ruscus aculeatus	R	4

A.30.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Layer	Ellenberg value
Quercus petraea	5	Canopy	4
Acer campestre	4	Canopy	6
Fraxinus excelsior	5	Canopy	6
Castanea sativa	4	Canopy	5
Sorbus aria	2	Canopy	4
Prunus avium	2	Canopy	6
Corylus avellana	6	Understorey	6
Ligustrum vulgare	3	Understorey	5
Sambucus nigra	2	Understorey	7
Ilex aquifolium	1	Understorey	5
Daphne laureola	3	Understorey	5
Ruscus aculeatus	1	Understorey	4
Crataegus monogyna	3	Understorey	6
Acer campestre	2	Understorey	6
Mercurialis perennis	8	Field	7
Geum urbanum	2	Field	7
Rubus fruticosus	4	Field	6
Acer campestre	1	Field	6
Ligustrum vulgare	1	Field	5
Urtica dioica	2	Field	8
Hyacinthoides non-scripta	4	Field	6
Galium aparine	3	Field	8
Arum maculatum	1	Field	7
Fraxinus excelsior	1	Field	6
Hedera helix	1	Field	6
Viola sp.	1	Field	N/A

A.30.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	
2	2	Some evidence present.
3	3	
4	3	
5	3	
6	2	
7	2	Scarcity of tree regeneration.
8	3	
9	3	
10	2	Sparse canopy.
11	1	
12	3	
13	2	Some damaged ground from forest school activity.
Total:	31 (Moderate)	

A.30.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Assembled deadwood indicating the presence of a forestry school within the woodland	 Ground layer showing wood dock and dogs mercury
Photograph 3	**Photograph 4**
 Area of cleared open space which appears to be used as a campsite	 Base of semi mature oak tree

Photograph 5

Tools/equipment possibly used in forest school in the woodland

A.31 Merrals Shaw (AW_Theme_ID 1486881) AW

A.31.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus petraea	R	4
Quercus robur	R	4
Carpinus betulus	R	6
Castanea sativa	A	5
Fraxinus excelsior	O	6
Understorey		
Ligustrum vulgare	R	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus monogyna	R	6
Sambucus nigra	O	7
Ilex aquifolium	R	5
Viburnum lantana	R	5
Field layer		
Acer campestre	*O*	6
Alliaria petiolata	*R*	8
Anthriscus sylvestris	*O*	7
Arum maculatum	*O*	7
Brachypodium sylvaticum	*R*	5
Brachythecium rutabulum	*O*	8
Bromus sterilis	*R*	7

Latin Name	DAFOR	Ellenberg value
Circaea lutetiana	*O*	6
Clematis vitalba	*R*	5
Dactylis glomerata	*R*	6
Daphne laureola	*R*	5
Dryopteris filix-mas	*R*	5
Euphorbia amygdaloides	*R*	6
Ficaria verna	O	6
Fragaria vesca	R	4
Galium aparine	R	8
Geranium robertianum	R	6
Geum urbanum	R	7
Hedera helix	O	6
Heracleum sphondylium	R	7
Hyacinthoides non-scripta	F	6
Lamiastrum galeobdolon	R	6
Lonicera periclymenum	R	5
Melica uniflora	F and LA	5
Mercurialis perennis	F and LA	7
Moehringia trinervia	R	6
Myosotis arvensis	R	6
Orchis mascula	R	4
Plantago major	R	7
Poa nemoralis	O	5
Poa trivialis	F	6
Primula vulgaris	R	4
Rubus fruticosus	F	6
Rumex sanguineus	O	7
Ruscus aculeatus	R	4
Scrophularia nodosa	R	6
Tamus communis	R	6
Taraxacum officinale agg.	R	6
Urtica dioica	R	8
Veronica montana	R	6
Viola sp.	O	4

A.31.2 Quadrat 1 (Q1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	5	6
Castanea sativa	8	5
Understorey		
Acer campestre	3	6
Corylus avellana	5	6
Sambucus nigra	1	7
Viburnum lantana	1	5

Cornus sanguinea	1	6
Crataegus monogyna	1	6

A.31.3 Transect 2 (T2)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	A	5
Fraxinus excelsior	F	6
Quercus robur	O	4
Betula pendula	O	4
Carpinus betulus	F	6
Acer pseudoplatanus	O	6
Acer campestre	O	6
Understorey		
Ilex aquifolium	R	5
Corylus avellana	O	6
Viburnum lantana	R	5
Field layer		
Geum urbanum	O	7
Hyacinthoides non-scripta	A	6
Epilobium sp.	R	N/A
Rubus fruticosus	A	6
Crataegus monogyna	O	6
Fraxinus excelsior	O	6
Circaea lutetiana	O	6
Euphorbia amygdaloides	R	6
Carex sylvatica	R	5
Poa trivialis	O	6
Dryopteris filix-mas	R	5
Geranium robertianum	R	6
Alliaria petiolata	R	8
Lonicera periclymenum	R	5
Arum maculatum	R	7
Viola sp.	R	N/A
Rumex sanguineus	R	7
Dryopteris dilatata	R	5

A.31.4 Quadrat 2 (Q2)

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	5	6
Castanea sativa	9	5
Betula pendula	3	4
Quercus robur	3	4
Acer pseudoplatanus	2	6
Understorey		
Corylus avellana	5	6
Acer campestre	3	6
Crataegus monogyna	3	6
Ilex aquifolium	2	5
Viburnum lantana	1	5
Carpinus betulus	4	6
Field layer		
Hyacinthoides non-scripta	7	6
Rubus fruticosus	4	6
Circaea lutetiana	4	6
Leaf litter	8	N/A
Fraxinus excelsior	2	6
Poa trivialis	4	6
Geum urbanum	2	7

A.31.5 Merrals Shaw (AW_Theme_ID 1486881) AW

A.31.6 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	1	-
6	2	-
7	3	-
8	3	-
9	3	-
10	2	-
11	1	-
12	1	-
13	2	-
Total:	29 (**MODERATE)**	

A.31.7 Condition assessment: Transect 2

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	2	-
6	3	-
7	3	-
8	3	-
9	3	-
10	2	-
11	1	-
12	1	-
13	2	-
Total:	31 (Moderate)	

A.31.8 Additional condition assessment notes: None

A.31.9 ThemeID 1486881 (Merrals Shaw)

Photograph 1	Photograph 2
 Field layer along transect, with hazel coppice and bluebells	 Locally abundant spurge laurel (AWI), in the woodland field layer, surrounded by historically coppiced sweet chestnut.
Photograph 3	**Photograph 4**

	
Young sweet chestnut coppice arising from a mature, potentially ancient stool.	Woodland showing signs of recent management, including clearing and recently cut branches.
Photograph 5	**Photograph 6**
	
Track though woodland. Young sweet chestnut coppice growing from mature, possibly ancient, stools.	Locally abundant ivy with occasional common nettles beneath the shaded canopy. Lack of AWI species.

A.32 Milstead/Bassilne Wood (AW_Theme_ID 1498502) AW

A.32.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Taxus baccata	O	5
Pinus sylvestris	R	2
Fraxinus excelsior	O	6
Fagus sylvatica	F	5
Prunus avium	O	6
Carpinus betulus	O	6
Quercus robur	O	4
Castanea sativa	A	5
Pseudotsuga menziesii	R	4
Robinia pseudoacacia	R	6
Understorey		
Sambucus nigra	F	7
Prunus spinosa	R	6
Corylus avellana	O	6
Euonymus europaeus	R	5
Crataegus monogyna	R	6
Ruscus aculeatus	R	4
Rubus fruticosus	O	6
Cornus sanguinea	R	6
Ilex aquifolium	O	5
Lonicera periclymenum	R	5
Clematis vitalba	R	5
Rosa sp. (Burnet)	R	N/A
Ribes rubrum	R	6
Cytisus scoparius	R	4
Field		
Urtica dioica	O	8
Galium aparine	O	8
Hyacinthoides non-scripta	A	6
Glechoma hederacea	O	7
Pteridium aquilinum	R	3
Arum maculatum	F	7
Mercurialis perennis	A	7
Viola odorata	R	7
Anemone nemorosa	A	4
Acer platanoides	O	7
Brachypodium sylvaticum	R	5
Ficaria verna	O	6
Poa trivialis	O	6
Veronica chamaedrys	F	5
Alliaria petiolata	O	8

Latin Name	DAFOR	Ellenberg value
Geum urbanum	O	7
Circaea lutetiana	O	6
Primula vulgaris	R	4
Prunella vulgaris	R	4
Veronica serpyllifolia	R	5
Kindbergia praelonga	F	N/A
Brachythecium rutabulum	F	N/A
Rumex sanguineus	O	7
Atrichum undulatum	O	N/A
Carex sylvatica	O	5
Veronica montana	R	6
Potentilla sterilis	R	5
Cirsium vulgare	R	6
Dipsacus fullonum	O	7
Epilobium hirsutum	R	7
Hypericum hirsutum	R	5
Geranium dissectum	R	6
Ajuga reptans	R	5
Jacobaea vulgaris	R	4
Myosotis sylvatica	R	5
Cirsium palustre	R	4
Pulicaria dysenterica	R	4
Euphorbia amygdaloides	O	6
Picris echioides	R	6
Lamiastrum galeobdolon	F	6
Potentilla reptans	R	5
Chamerion angustifolium	R	5
Plantago lanceolata	O	4
Poa annua	R	7
Dryopteris filix-mas	R	5
Viola riviniana	O	4
Teucrium scorodonia	R	3
Pteridium aquilinum	R	3
Hypericum perforatum	R	5
Moehringia trinervia	R	6
Silene dioica	R	7
Holcus lanatus	R	5
Taraxacum officinale agg.	R	6
Conopodium majus	R	5
Veronica officinalis	R	4
Veronica hederifolia	R	6
Narcissus sp.	R	N/A
Carex remota	R	6
Adoxa moschatellina	R	5

Quadrat 1 (Q1)

Latin Name	DAFOR	Layer	Ellenberg value
Canopy			
Fagus sylvatica	9		5
Quercus robur	4		4
Pseudotsuga menziesii	1		4
Fraxinus excelsior	1		6
Understorey			
Taxus baccata	5		5
Sambucus nigra	1		7

A.32.2 Milstead/Bassilne Wood (AW_Theme_ID 1498502) AW

A.32.3 Site Condition – not completed for this site

A.32.4 Milstead/Bassilne Wood (AW_Theme_ID 1498502) AW

Photograph 1	Photograph 2
 Old tree guards indicating historic management and planting	 Area of open grassland adjacent to woodland

Photograph 3	Photograph 4
 Old sweet chestnut coppice with dense ground flora	 Areas of bare forest ground

A.33 Mintching/Kingswood AW

A.33.1 Transect 1

Latin Name	DAFOR	Layer	Ellenberg value
Canopy			
Acer campestre	R	Canopy	6
Acer pseudoplatanus	F	Canopy	6
Betula pendula	O	Canopy	4
Castanea sativa	F	Canopy	5
Fraxinus excelsior	O	Canopy	6
Quercus petraea	R	Canopy	4
Salix sp.	R	Canopy	N/A
Understorey			
Cornus sanguinea	R	Understorey	6
Corylus avellana	O	Understorey	6
Crataegus monogyna	O	Understorey	6
Euonymus europaeus	R	Understorey	5
Lonicera periclymenum	O	Understorey	5
Sambucus nigra	O	Understorey	7
Viburnum lantana	R	Understorey	5
Field layer			
Ajuga reptans	R	Field	5
Chamaenerion angustifolium	R	Field	5
Glechoma hederacea	R	Field	7
Heracleum sphondylium	R	Field	7
Lonicera periclymenum	R	Field	5

Latin Name	DAFOR	Layer	Ellenberg value
Mercurialis perennis	R	Field	7
Pteridium aquilinum	F	Field	3
Rubus fruticosus	F	Field	6
Rumex sanguineus	R	Field	7
Tamus communis	R	Field	6
Urtica dioica	R	Field	8
Viola sp.	R	Field	N/A

A.33.2 Quadrat 1 in Transect 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	7	6
Betula pendula	2	4
Castanea sativa	8	5
Fraxinus excelsior	4	6
Quercus petraea	1	4
Understorey		
Cornus sanguinea	2	6
Corylus avellana	3	6
Crataegus monogyna	4	6
Sambucus nigra	1	7
Field layer		
Castanea sativa	3	5
Cirsium palustre	1	4
Hypericum pulchrum	1	3
Lonicera periclymenum	4	5
Rubus fruticosus	7	6
Teucrium scorodonia	3	3

A.33.3 Mintching Kingswood AW

A.33.4 Condition assessment: polygon at 249_AW

Woodland criteria	Score	Comments
1	1	
2	3	
3	3	No invasives
4	3	Very diverse, especially shrub layer
5	2	A fair amount of sweet chestnut
6	2	
7	2	
8	2	Ash dieback
9	1	A few AWI in adjacent woodland (E.g., Euphorbia amygdaloides) but not in verge and NVC community unclear
10	2	
11	1	

Woodland criteria	Score	Comments
12	1	
13	3	
Total:	26 (Moderate)	

A.33.5 Additional condition assessment notes: N/A

A.33.6 Mintching/Kingsdown Wood AW

Photograph 1	Photograph 2
Adjacent woodland dominated by sweet chestnut coppice. 	Generally open canopy of about 20-30 yr. old sweet chestnut, birch sycamore and ash over hawthorn and a diverse range of less frequent shrubs 
Photograph 3	**Photograph 4**
Section of Motorway verge with birch, sycamore, hawthorn, and oak 	dense young sweet chestnut coppice 

Photograph 5	Photograph 6
Section of verge with sweet chestnut and sycamore over scattered hawthorn 	Appears to be secondary woodland, naturally established, though given the diversity of the shrub layer some planting is likely 

A.34 Mucking Heath LWS

A.34.1 Habitat parcel 1 255

Latin Name	DAFOR	Ellenberg value
Canopy (woodland)		
N/A		
Understorey (woodland		
N/A		
Field layer (woodland and grassland)		
Achillea millefolium	F	4
Agrostis capillaris	A-D	4
Anthoxanthum odoratum	F	3
Arrhenatherum elatius	F	7
Carex spicata	R	4
Centaurea nigra	O	5
Centaurea scabiosa	O	3
Centaurium erythraea	R	3
Cirsium vulgare	O	6
Convolvulus arvensis	O	6
Crepis capillaris	R	4
Dactylis glomerata	F	6
Festuca rubra	F	5
Galium verum	F	2
Holcus lanatus	O	5
Hypericum perforatum	O	5
Hypochaeris radicata	O	3
Knautia arvensis	O	4
Lactuca serriola	O	6

Latin Name	DAFOR	Ellenberg value
Luzula campestris	R	2
Malva moschata	R	4
Malva sylvestris	R	7
Phleum pratense	O	6
Pilosella officinarum	R	2
Plantago lanceolata	O	4
Prunus avium	R	6
Pseudoscleropodium purum	R	#N/A
Quercus robur	R	4
Rosa sp.	O	#N/A
Rumex acetosella	O	3
Senecio jacobaea	O	4
Urtica dioica	O	8

A.34.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy (woodland 50 x 50m)		
N/A		
Understorey (50 x 50m dense scrub/10m x 10m sparse scrub)		
N/A		
Field layer (4 x 4m for woodland, or 2 x 2m for grassland)		
Achillea millefolium	3	4
Agrostis capillaris	8	4
Anthoxanthum odoratum	4	3
Dactylis glomerata	4	6
Festuca rubra	7	5
Plantago lanceolata	3	4
Rumex acetosella	1	3

A.34.3 Quadrat 2 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy (woodland 50 x 50m)		
N/A		
Understorey (50 x 50m dense scrub/10m x 10m sparse scrub)		
N/A		
Field layer (4 x 4m for woodland, or 2 x 2m for grassland)		
Agrostis stolonifera	4	6
Alopecurus pratensis	1	7
Anthoxanthum odoratum	3	3
Arrhenatherum elatius	8	7
Convolvulus arvensis	1	6
Dactylis glomerata	7	6
Festuca rubra	5	5

Latin Name	DOMIN	Ellenberg value
Galium verum	4	2
Helictotrichon pubescens	3	3
Poa pratensis	2	5
Rumex crispus	1	6

A.34.4 Habitat parcel (transect) 2

Latin Name	DAFOR	Ellenberg value
Canopy (woodland)		
Alnus cordata	R	#N/A
Crataegus monogyna	A-D	6
Fraxinus excelsior	O	6
Malus sp.	R	#N/A
Prunus spinosa	R	6
Quercus robur	O	4
Ulmus procera	A-D	6
Understorey (woodland)		
Buddleja davidii	O	5
Euonymus europaeus	R	5
Rosa sp.	O	#N/A
Sambucus nigra	O	7
Ulex europaeus	O	3
Field layer (woodland and grassland)		
Alliaria petiolata	R	8
Arrhenatherum elatius	A-D	
Brachypodium sylvaticum	O	5
Bromopsis ramosa	R	7
Cirsium vulgare	R	6
Conium maculatum	R	8
Cytisus scoparius	O	4
Galium aparine	O-LA	8
Geum urbanum	R	7
Glechoma hederacea	R	7
Hedera helix	F-LA	6
Heracleum sphondylium	R	7
Holcus lanatus	R	5
Hyacinthoides non-scripta	R	6
Ilex aquifolium	R	5
Picris hieracioides	R	3
Reseda luteola	R	6
Rubus fruticosus	A-D	6
Silene dioica	R	7
Stellaria media	R	7
Tamus communis	R	6
Teucrium scorodonia	R	3
Urtica dioica	O-LA	8

A.34.5 Quadrat 3 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy (woodland 50 x 50m)		
N/A		
Understorey (50 x 50m dense scrub/10m x 10m sparse scrub)		
Crataegus monogyna	7	6
Cytisus scoparius	3	4
Prunus sp.	4	#N/A
Ulex europaeus	4	3
Ulmus sp.	7	#N/A
Field layer (4 x 4m for woodland, or 2 x 2m for grassland)		
Reseda luteola	3	6
Rubus fruticosus	8	6

A.34.6 Mucking Heath LWS

A.34.7 Condition assessment: Habitat parcel 1 at 65_LWS

Grassland criteria	Score	Comments
1	Yes	-
2	Yes	A mixture of management regimes
3	No	Very little
4	Yes	-
5	Yes	-
6	No	-
Total:	Moderate	

A.34.8 Additional condition assessment notes: N/A

A.34.9 Condition assessment: Habitat parcel 2 at 65_LWS

Scrub criteria	Score	Comments
1	Yes	-
2	Yes	-
3	Yes	-
4	Yes	-
5	Yes	-
Total:	Good	

A.34.10 Additional condition assessment notes: N/A

A.34.11 Mucking Heath LWS

Photograph 1	Photograph 2
 Grassland with abundant lady's bedstraw, yarrow, common bent and occasional sheep's fescue, greater knapweed, mouse ear hawkweed and field woodrush	 Open scrub area
Photograph 3	**Photograph 4**
 Grassy track through scrub, often quite tightly grazed by rabbits	 In the western part a generally mixed scrub dominated by bramble, hawthorn, and English elm

Photograph 5	Photograph 6
	
Hawthorn and elm scrub above scattered bramble	In the northern end a tightly mown grassland grading into rough with extensive rabbit graizing

A.35 Nurstead and Cozenden Wood LWS and AW_ThemeID1498304 AW (Overlapping site)

A.35.1 Transect 1 in Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	O	6
Quercus robur	F	4
Understorey		
Acer campestre	F	6
Acer pseudoplatanus	R	6
Carpinus betulus	O	6
Cornus sanguinea	O	6
Corylus avellana	O	6
Euonymus europaeus	R	5
Ilex aquifolium	R	5
Prunus spinosa	O	6
Rosa canina	R	6
Sambucus nigra	O	7
Taxus baccata	R	5
Ulmus glabra	R	6
Viburnum lantana	F	5
Field layer		
Arctium lappa	R	9
Brachypodium sylvaticum	F	5
Hedera helix	D	6
Ligustrum vulgare	O	5
Lonicera periclymenum	O	5
Melica uniflora	R	5
Mercurialis perennis	A	7
Rubus fruticosus agg	O	6

Latin Name	DAFOR	Ellenberg value
Tamus communis	O	6

A.35.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	3	6
Quercus robur	7	4
Understorey		
Acer campestre	4	6
Acer pseudoplatanus	1	6
Carpinus betulus	1	6
Cornus sanguinea	1	6
Corylus avellana	1	6
Euonymus europaeus	1	5
Ilex aquifolium	1	5
Ligustrum vulgare	2	5
Prunus spinosa	3	6
Rosa canina	1	6
Sambucus nigra	1	7
Ulmus glabra	1	6
Viburnum lantana	5	5
Field layer		
Acer campestre	1	6
Brachypodium sylvaticum	5	5
Euonymus europaeus	1	5
Hedera helix	9	6
Lonicera periclymenum	3	5
Mercurialis perennis	3	7
Rubus fruticosus	4	6
Tamus communis	2	6

A.35.3 Condition assessment: Habitat parcel 1 at 218_AW

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	2	-
4	3	-
5	3	-
6	3	-
7	2	-
8	2	-
9	2	-
10	2	-
11	1	-
12	3	-
13	3	-
Total:	31 (Moderate)	

A.35.4 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
Bare ground patches 	Ground flora predominantly creeping bent 
Photograph 3	
Both areas of the V shaped land parcel are the same 	

A.36 Pot Kiln Wood and Sickle Wood SINC

A.36.1 Transect in Habitat parcel 1 (grassland)

Latin Name	DAFOR	Ellenberg value
Field layer		
Holcus lanatus	F	5
Ranunculus acris	R	4
Potentilla reptans	R	5
Agrostis stolonifera	F	6
Alopecurus pratensis	O	7
Lolium perenne	O	6
Juncus effusus	R	4
Juncus conglomeratus	R	3
Rumex crispus	R	6
Elytrigia repens	O	7
Cirsium arvense	O	6
Rubus fruticosus	O	6
Epilobium hirsutum	F	7
Phleum pratense	R	6
Cirsium vulgare	O	6
Pulicaria dysenterica	O	4
Scrophularia auriculata	R	7
Juncus inflexus	R	5
Vicia tetrasperma	R	6
Carex hirta	R	6
Lactuca serriola	R	6
Arrhenatherum elatius	F	7
Lotus corniculatus	O	2
Daucus carota	O	8
Convolvulus arvensis	R	6
Senecio jacobaea	R	4
Lathyrus pratensis	R	5
Trifolium repens	R	6
Plantago lanceolata	R	4
rumex sanguineus	O	7
Urtica dioica	O	8
Vicia sativa	R	4
Quercus robur	O	4
Hordeum secalinum	O	6

A.36.2 Quadrat 1 in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Field layer		
Elytrigia repens	5	7
Arrhenatherum elatius	7	7
Alopecurus pratensis	3	7
poa pratensis	3	5
Cirsium arvense	1	6
Dactylis glomerata	1	6
Holcus lanatus	3	5
Hordeum secalinum	2	6

A.36.3 Transect in Habitat parcel 2 (woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	A	4
Crataegus monogyna	O	6
Fraxinus excelsior	F	6
Understorey		
Viburnum opulus	R	6
Prunus spinosa	O	6
Quercus robur	R	4
Acer campestre	O	6
Field layer		
Rosa sp.	O	N/A
Dactylis glomerata	R	6
Fraxinus excelsior (seedling)	F	6
Hedera helix	F	6
Crataegus monogyna (seedling)	O	6
Rubus fruticosus	F	6
Geum urbanum	O	7
Arrhenatherum elatius	O	7
*Acer campestre (*seedling*)*	O	6
Alopecurus pratensis	R	7
Rumex sanguineus	R	7
Anthriscus sylvestris	R	7

A.36.4 Quadrat 2 in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Fraxinus excelsior	6	6
Quercus robur	9	4
Understorey		
Crataegus monogyna	3	6
Acer campestre	2	6
Field layer		
Rubus fruticosus	6	6
Prunus spinosa	5	6
Rumex sanguineus	1	7
Hedera helix	8	6
Fraxinus excelsior	3	6
Acer campestre	2	6
Calystegia sepium	3	7

A.36.5 Pot Kiln Wood and Sickle Wood SINC

A.36.6 Condition assessment: HABITAT PARCEL 1 at 237_AW

Grassland criteria	Score	Comments
1	No	Generally species poor though some patches with lotus and caucus
2	Yes	Some areas have been grazed. Probably around 20% but generally tall grassland dominated
3	No	Little bare ground
4	Yes	Bramble confined to periphery
5	Yes	-
6	No	-
Total:	Moderate	

A.36.7 Condition assessment: HABITAT PARCEL 2 at 332_AW

Woodland criteria	Score	Comments
1	1	Young plantation
2	3	No signs
3	3	None
4	3	-
5	3	Significant sycamore
6	1	No open space
7	2	-
8	1	Ash dieback
9	1	-
10	1	-
11	1	-

Woodland criteria	Score	Comments
12	1	-
13	3	-
Total:	24 (Poor)	

A.36.8 Pot Kiln Wood and Sickle Wood SINC

Photograph 1	Photograph 2
 Dense ground flora where sunlight reaches the ground among lots of fallen deadwood	 False oat grass meadow

Photograph 3
 False oat grass and tall ruderal clearing of woodland

A.37 Putt Wood AW (ThemeID 1486764)

A.37.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	A	6
Fraxinus excelsior	O	6
Understorey		
Acer platanoides	O	7
Acer pseudoplatanus	O	6
Clematis vitalba	F	5
Cornus sanguinea	F	6
Corylus avellana	F	6
Crataegus monogyna	F	6
Euonymus europaeus	R	5
Ligustrum vulgare	O	5
Prunus spinosa	R	6
Rosa sp.	O	N/A
Ruscus aculeatus	R	4
Viburnum lantana	F	5
Field layer		
Arum maculatum	R	7
Brachypodium sylvaticum	F	5
Dryopteris filix-mas	R	5
Fragaria vesca	O	4
Geranium robertianum	R	6
Geum urbanum	O	7
Glechoma hederacea	R	7
Hedera helix	F	6
Heracleum sphondylium	R	7
Hypericum sp.	R	N/A
Mercurialis perennis	O	7
Primula vulgaris	R	4
Rubus fruticosus	F	6
Rumex sanguineus	F	7
Stachys sylvatica	O	8
Tamus communis	F	6
Torilis japonica	R	7
Urtica dioica	O	8

A.37.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	9	6
Fraxinus excelsior	4	6
Understorey		
Clematis vitalba	6	5
Cornus sanguinea	3	6
Corylus avellana	1	6
Crataegus monogyna	1	6
Euonymus europaeus	4	5
Ligustrum vulgare	3	5
Prunus spinosa	2	6
Rosa sp.	2	N/A
Ruscus aculeatus	1	4
Viburnum lantana	3	5
Field layer		
Acer platanoides	2	7
Acer pseudoplatanus	2	6
Brachypodium sylvaticum	4	5
Euonymus europaeus	3	5
Fragaria vesca	2	4
Fraxinus excelsior	3	6
Galium aparine	4	8
Glechoma hederacea	3	7
Hypericum hirsutum	2	5
Primula vulgaris	3	4
Prunus spinosa	3	6
Rubus fruticosus	6	6
Rumex sanguineus	2	7
Viola sp.	1	N/A

A.37.3 Condition assessment: habitat parcel at 220_AW

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
7	3	-
8	2	-
9	3	-
10	2	-
11	1	-
12	3	-
13	2	-
Total:	31 (Moderate)	

Additional condition assessment notes: N/A

Photograph 1	Photograph 2
Very steep bank next to a bridge is primarily field maple with privet & spindle understorey 	Some species of ancient woodland indicators such as arum lily, dogs Mercury and wild strawberry 
Photograph 3	**Photograph 4**
The trees are not obviously planted and have an age range of approximately 40 years 	The trees are not obviously planted and have an age range of approximately 40 years 

A.38 Rainbow Shaw LWS

A.38.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Fraxinus excelsior	F	6
Quercus robur	F	4
Acer campestre	R	6
Carpinus betulus	R	6
Betula pendula	R	4
Understorey		
Sambucus nigra	A	7
Acer campestre	F	6
Crataegus monogyna	F	6
Fraxinus excelsior	R	6
Corylus avellana	O	6
Prunus avium	O	
Field layer		
Poa trivialis	O	6
Rubus fruticosus	F	6
Moehringia trinervia	O	6
Silene dioica	F	7
Urtica dioica	A	8
Viola odorata	R	7
Hyacinthoides non-scripta	A	6
Galium aparine	D	8
Alliaria petiolata	F	8
Geranium robertianum	F	6
Pteridium aquilinum	F	3
Bromus sterilis	R	7
Stachys sylvatica	R	8
Veronica hederifolia	F	6
Conopodium majus	O	5
Geum urbanum	O	7
Glechoma hederacea	R	7
Anthriscus sylvestris	R	7
Conium maculatum	R	8
Bryonia dioica	R	7
Arum maculatum	R	7
Sonchus oleraceus	R	7

A.38.2 Quadrat 1 (Q1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	8	5
Fraxinus excelsior	4	6
Quercus robur	4	4
Understorey		
Crataegus monogyna	3	6
Sambucus nigra	4	7
Acer campestre	3	6
Corylus avellana	2	6

A.38.3 Condition assessment: Transect 1

Woodland criteria	Score	Comments
1	2	Two age classes, mature and semi
2	2	-
3	3	-
4	3	-
5	1	Dominated by sweet chestnut
6	3	-
7	2	Some regrowth but mainly from suckering
8	3	-
9	2	Very few indicators but
10	3	-
11	1	-
12	3	Very abundant
13	3	Very limited signs of enrichment. Restricted to small area at NE end
Total:	31 (Moderate)	

Additional condition assessment notes: None

Photograph 1	Photograph 2
 Dense nettle ground layer with interspersed bracken	 Dense cleavers ground flora
Photograph 3	**Photograph 4**
 Gone over bluebell carpet	 Cleared woodland path amongst dense ground flora and semi mature canopy

A.39 Rede Common LNR

A.39.1 Transect 1, woodland

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer platanoides	O	7
Crataegus monogyna	F	6
Fraxinus excelsior	R	6
Quercus robur	O	4
Fagus sylvatica	R	5
Prunus avium	O	6
Malus sp.	R	N/A

Latin Name	DAFOR	Ellenberg value
Salix caprea	R	7
Understorey		
Ulmus sp.	O	N/A
Hedera helix	A	6
Rubus fruticosus	F	6
Sambucus nigra	R	7
Viburnum opulus	R	6
Cornus sanguinea	R	6
Prunus lusitanica	R	N/A
Rosa sp.	R	N/A
Ligustrum ovalifolium	O	8
Acer campestre	O	6
Ilex aquifolium	O	5
Acer pseudoplatanus	R	6
Prunus spinosa	R	6
Viscum album	R	5
Lonicera nitida	R	N/A
Field layer		
Ficaria verna	R	6
Urtica dioica	O	8
Veronica hederifolia	R	6
Viola odorata	O	7
Brachypodium sylvaticum	R	5
Arum maculatum	R	7
Rumex sanguineus	O	7
Smyrnium olusatrum	F	7
Geum urbanum	R	7
Geranium robertianum	R	6
Poa trivialis	O	6
Hyacinthoides non-scripta	R	6

A.39.2 Quadrat 1, woodland

Latin Name	DOMIN	Ellenberg value
Canopy		
Crataegus monogyna	8	6
Quercus robur	6	4
Fagus sylvatica	4	5
Acer pseudoplatanus	1	6
Fraxinus excelsior	1	6
Understorey		
Ilex aquifolium	2	5
Field layer		
Acer pseudoplatanus	1	6
Hedera helix	8	6
Rubus fruticosus	4	6
Ligustrum ovalifolium	3	8
Sambucus nigra	2	7
Arum maculatum	1	7
Crataegus monogyna	3	6
Fraxinus excelsior	1	6

Latin Name	DOMIN	Ellenberg value
Xanthoria sp.		N/A
Physcia sp.		N/A

A.39.3 Transect 2, scrub

Latin Name	DAFOR	Ellenberg value
Canopy (scrub)		
Prunus avium	O	6
Crataegus monogyna	F	6
Carpinus betulus	O	6
Fagus sylvatica	O	5
Juglans regia	R	7
Malus sp.	R	N/A
Sorbus aucuparia	R	4
Sorbus aria	R	4
Understorey		
Rubus fruticosus	F	6
Lonicera periclymenum	R	5
Corylus avellana	O	6
Acer campestre	O	6
Prunus sp.	O	N/A
Ulmus sp	R	N/A
Field layer		
None recorded		

A.39.4 Transect 3, grassland

Latin Name	DAFOR	Ellenberg value
Achillea millefolium	R	4
Allium sp.	O	N/A
Alopecurus pratensis	O	7
Anthriscus sylvestris	O	7
Arrhenatherum elatius	O	7
Bromus mollis	O	4
Bromus sterilis	O	7
Capsella bursa-pastoris	R	7
Cerastium fontanum	R	4
Cerastium glomeratum	O	5
Chamerion angustifolium	O	5
Cirsium arvense	O	6
Dactylis glomerata	F	6
Epilobium sp.	R	N/A
Galium aparine	O	8
Geranium dissectum	O	6
Geranium molle	O	5
Heracleum sphondylium	O	7
Hypericum perforatum	R	5
Hypochaeris radicata	O	3
Jacobaea vulgaris	O	4

Latin Name	DAFOR	Ellenberg value
Lamium album	R	8
Lamium purpureum	O	7
Lolium perenne	F	6
Malva sylvestris	R	7
Medicago arabica	R	5
Plantago lanceolata	O	4
Plantago major	O	7
Poa annua	R	7
Poa pratensis	O	5
Potentilla reptans	R	5
Ranunculus bulbosus	F	4
Rhinanthus minor	R	4
Rumex acetosa	O	4
Rumex acetosella	R	3
Rumex obtusifolius	O	9
Schedonorus arundinaceus	R	6
Smyrnium olusatrum	F	7
Sonchus oleraceus	R	7
Symphoricarpos albus	R	7
Taraxacum officinale agg.	R	6
Trifolium dubium	R	5
Trifolium pratense	O	5
Trifolium repens	O	6
Urtica dioica	O	8
Veronica chamaedrys	O	5
Vicia sativa	O	4

A.39.5 Q3, grassland

Field layer	Domin	Ellenberg
Vicia sativa	2	4
Cerastium fontanum	2	4
Jacobaea vulgaris	2	4
Taraxacum agg	3	N/A
Alopecurus pratensis	3	7
Trifolium dubium	1	5
Lolium perenne	4	6
Dactylis glomerata	5	6
Holcus lanatus	3	5
Arrhenatherum elatius	4	7
Geranium dissectum	1	6
Medicago arabica	1	5
Plantago lanceolata	1	4

A.39.6 Condition assessment: Transect 1, Woodland

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	2	-
4	3	-
5	3	-
6	1	-
7	3	-
8	3	-
9	1	-
10	2	-
11	1	-
12	2	-
13	2	-
Total:	28 (Moderate)	

A.39.7 Condition assessment: Transect 2, Scrub

Scrub criteria	Y/N	Comments
1	Yes	-
2	No	-
3	Yes	-
4	Yes	-
5	Yes	-
Total:	Moderate	

A.39.8 Condition assessment: Transect 3, Grassland

Grassland criteria	Y/N	Comments
1	Yes	-
2	Yes	-
3	Yes	-
4	Yes	-
5	No	-
6	Yes	-
7	Yes	-
Total:	Good	

A.39.9 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Cleared woodland path amongst nettle and bramble	 Bark of oak tree
Photograph 3	
 Path adjacent to a coppice	

A.40 River Medway And Marshes, Wouldham LWS

A.40.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Field layer		
Atriplex patula	A	7
Aster tripolium	F	6
Spergularia media	O	5
Spartina sp.	F	N/A
Bolboschoenus maritimus	F	7
Puccinellia maritima	O	6
Chenopodium rubrum	F	8
Elytrigia atherica	O	6

A.40.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Field layer		
Atriplex patula	6	7
Aster tripolium	5	6
Elytrigia atherica	2	6
Spartina sp.	3	N/A
Puccinellia maritima	2	6
Mud	6	N/A

A.40.3 Condition assessment: Habitat parcel at 441_LWS

Coastal saltmarsh criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	1	-
5	3	-
6	2	-
Total:	14 (Good)	

A.40.4 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
Primarily sea aster and halberd orache with sea couch 	A riparian stretch of tidal mud 
Photograph 3	**Photograph 4**
Salt marsh grass, cord grass and sea clubrush also present 	Halberd orache and sea aster most common within the quadrat, with large area of mud 

A.41 River Medway between Cuxton and Temple Marsh LWS

A.41.1 Grazing marsh, Habitat parcel 1 (northern field)

Latin Name	DAFOR	Ellenberg value
Field layer		
Euonymus europaeus	R	5
Buddleja davidii	O	5
Ailanthus altissima	R	N/A
Sambucus nigra	O	7
Carduus crispus	R	7
Urtica dioica	F	8
Dipsacus fullonum	F	7
Origanum vulgare	F	4
Dactylis glomerata	O	6
Smyrnium olusatrum	R	7
Potentilla reptans	F	5
Arctium lappa	F	9
Ballota nigra	R	6
Rumex sanguineus	R	7
Rumex crispus	R	6
Conium maculatum	R	8
Scrophularia nodosa	O	6
Silene latifolia	R	6
Lithospermum officinale	R	5
Mercurialis perennis	LA	7
Vulpia bromoides	R	3
Cornus sanguinea	R	6
Holcus lanatus	F	5
Agrostis stolonifera	O	6
Poa trivialis	F	6
Glechoma hederacea	O	7
Iris foetidissima	R	5
Medicago lupulina	R	4
Hypericum perforatum	F	5
Viola sp	O	N/A
Malva sylvestris	R	7
Arrhenatherum elatius	O	7
Bromopsis erecta	R	3
Geranium dissectum	R	6
Rubus fruticosus	R	6
Galium mollugo	O	4
Solanum dulcamara	R	7
Verbena officinalis	R	6

A.41.2 Quadrats 1 and 2 (northern grass field)

Latin Name	DOMIN	Ellenberg value
Q 1 Field layer		
Viola sp	5	N/A
Potentilla reptans	4	5
Festuca rubra	8	5
Origanum vulgare	4	4
Hypericum perforatum	3	5
Agrostis capillaris	4	4
Q 2 Field layer		
Urtica dioica	6	8
Poa trivialis	7	6
Cirsium arvense	6	6
Hypericum perforatum	3	5
Glechoma hederacea	2	7
Origanum vulgare	1	4
Dipsacus fullonum	1	7
Myosotis sp	1	N/A
Galium aparine	1	8

A.41.3 Habitat parcel 2 (T2) South grassland

Latin Name	DAFOR	Ellenberg value
Field layer		
Juncus effusus	R	4
Atriplex prostrata	F	7
Alopecurus geniculatus	R	6
Agrostis stolonifera	A	6
Holcus lanatus	O	5
Aster tripolium	R	6
Hordeum secalinum	F	6
Juncus gerardii	R	6
Spergularia media	O	5
Rumex crispus	R	6
Festuca arundinacea	R	6
Elytrigia atherica	O	6
Bolboschoenus maritimus	F	7

A.41.4 Quadrats 3 and 4 (southern grass field)

Latin Name	DOMIN	Ellenberg value
Q3. Field Layer		
Bolboschoenus maritimus	4	7
Hordeum secalinum	3	6
Agrostis stolonifera	8	6

Latin Name	DOMIN	Ellenberg value
Cirsium arvense	4	6
Holcus lanatus	3	5
Picris echioides	1	6
Sonchus arvensis	1	6
Q4. Field layer		
Atriplex prostrata	3	7
Agrostis stolonifera	9	6
Festuca rubra	3	5

A.41.5 Habitat parcel 3 (T3) Hedge

Latin Name	DAFOR	Ellenberg value
Woody species		
Crataegus monogyna	F	6
Sambucus nigra	F	7
Rhamnus cathartica	R	6
Prunus avium	O	6
Ligustrum vulgare	O	5
Woodland species		
Urtica dioica	A	8
Conium maculatum	R	8
Glechoma hederacea	F	7

A.41.6 Habitat parcel 4 (saltmarsh)

Latin Name	DAFOR	Ellenberg value
Field layer		
Aster tripolium	F	6
Atriplex patula	F	7
Beta vulgaris	R	8
Bolboschoenus maritimus	O	7
Atriplex portulacoides	O	6
Plantago maritima	R	4
Puccinellia maritima	A	6
Spartina anglica	R	6
Suaeda maritima	R	6
Trifolium pannonicum	F	N/A

A.41.7 Quadrat 5 in Habitat parcel 4 (saltmarsh)

Latin Name	DOMIN	Ellenberg value
Field layer		
Atriplex patula	6	7
Puccinellia maritima	10	6
Trifolium pannonicum	3	N/A

A.41.8 Habitat parcel 5 (saltmarsh)

Latin Name	DAFOR	Ellenberg value
Field layer		
Atriplex littoralis	F	6
Atriplex patula	F	7
Beta vulgaris	R	8
Bolboschoenus maritimus	O	7
Chenopodium rubrum	R	8
Elytrigia atherica	O	6
Juncus inflexus	R	5
Picris echioides	R	6
Puccinellia maritima	O	6
Salicornia sp.	O	N/A
Sonchus asper	R	6
Spergularia media	F	5
Suaeda maritima	F	6
Trifolium pannonicum	O	N/A

A.41.9

A.41.10 Quadrat 6 in Habitat parcel 5 (saltmarsh)

Latin Name	DOMIN	Ellenberg value
Field layer		
Spergularia media	3	5
Atriplex littoralis	5	6
Atriplex patula	4	7
Suaeda maritima	4	6
Puccinellia maritima	1	6
Salicornia sp.	1	N/A
Trifolium pannonicum	1	N/A
Bolboschoenus maritimus	2	7
Elytrigia atherica	3	6

A.41.11 Habitat parcel 6

Latin Name	DAFOR	Ellenberg value
Field layer		
Atriplex patula	O	7
Atriplex portulacoides	LA	6
Beta vulgaris	R	8
Bolboschoenus maritimus	LA TO LD	7
Carex acutiformis	R	6
Elytrigia atherica	F	6
Honckenya peploides	O	6
Plantago maritima	O	4
Smyrnium olusatrum	R	7
Spartina anglica	O	6
Suaeda maritima	O	6
Trifolium pannonicum	O	N/A
Triglochin maritimum	R	5

A.41.12 Quadrat 7 in Habitat parcel 6

Latin Name	DOMIN	Ellenberg value
Field layer		
Bolboschoenus maritimus	4	7
Atriplex patula	5	7
Atriplex portulacoides	5	6
Elytrigia atherica	7	6
Trifolium pannonicum	3	N/A

A.41.13 Habitat parcel 7 (mixed scrub)

Latin Name	DAFOR	Ellenberg value
Understorey		
Acer campestre	O	6
Buddleja davidii	R	5
Cornus sanguinea	R	6
Crataegus monogyna	F	6
Fraxinus excelsior	F	6
Ligustrum vulgare	F	5
Prunus avium	R	6
Prunus spinosa	F	6
Taxus baccata	R	5
Viburnum lantana	O	5
Field layer		
Anthriscus sylvestris	O	7
Arrhenatherum elatius	R	7
Artemisia vulgaris	R	7
Arum maculatum	R	7
Ballota nigra	R	6
Brachypodium sylvaticum	R	5
Bromus sterilis	R	7
Clematis vitalba	R	5
Dactylis glomerata	R	6
Daucus carota	R	8
Elytrigia atherica	F	6
Epilobium sp.	R	N/A
Fraxinus excelsior	O	6
Galium aparine	R	8
Geranium robertianum	R	6
Hedera helix	A	6
Heracleum sphondylium	R	7
Inula conyzae	R	3
Picris echioides	R	6
Picris hieracioides	R	3
Plantago major	R	7
Rubus fruticosus	F	6
Torilis japonica	F	7
Vicia sativa	R	5

A.41.14 Quadrat 7 in Habitat parcel 7

Latin Name	DOMIN	Ellenberg value
Understorey		
Clematis vitalba	3	5
Crataegus monogyna	8	6
Fraxinus excelsior	6	6
Hedera helix	8	6
Ligustrum vulgare	5	5
Viburnum lantana	5	5
Field layer		
Crataegus monogyna	1	6
Fraxinus excelsior	4	6
Hedera helix	9	6
Prunus spinosa	2	6
Rubus fruticosus	4	6
Torilis japonica	4	7

A.41.15 Condition assessment: Habitat parcel 1 at 213_AW

Grassland criteria	Score	Comments
1	Yes	-
2	Yes	-
3	Yes	-
4	Yes	-
5	No	-
6	Yes	-
7	Yes	-
Total:	Good	

A.41.16 Condition assessment: Habitat parcel 2 at 214_AW

Grassland criteria	Score	Comments
1	Yes	-
2	No	-
3	Yes	-
4	Yes	-
5	Yes	This bare ground is probably hyper saline and difficult to assess true percentage cover
6	Yes	-
7	Yes	-
Total:	Good	

A.41.17 Condition assessment: Habitat parcel 3 at 324_AW

Hedgerow criteria	Score	Comments
A1	Yes	-
A2	Yes	-
B1	No	-
B2	Yes	-
C1	Yes	-
C2	No	-
D1	Yes	-
D2	Yes	-
Total:	Good	

A.41.18 Condition assessment: Habitat parcel 4 at 216_AW

Coastal saltmarsh criteria	Score	Comments
1	1	Embankment having a major impact
2	3	-
3	3	-
4	3	-
5	3	-
6	1	-
Total:	14 (Good)	

A.41.19 Condition assessment: Habitat parcel 5 at 215_AW

Coastal saltmarsh criteria	Score	Comments
1	No condition assessment completed	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
Total:		

A.41.20 Condition assessment: Habitat parcel 6 at 284_AW

Coastal saltmarsh criteria	Score	Comments
1	2	Difficult to say if there's an impact but there are lots of bridge piers in proximity
2	3	-
3	3	-
4	2	-
5	2	-
6	3	-
Total:	15 (Good)	

A.41.21 Condition assessment: Habitat parcel 7 at 368_AW

Scrub criteria	Score	Comments
1	Yes	-
2	Yes	-
3	Yes	-
4	Yes	-
5	Yes	-
Total:	Good	

A.41.22 **Additional condition assessment notes**: Habitat parcel 4 and Habitat parcel 6 originally marked as moderate condition but total good condition.

Photograph 1	Photograph 2
 Area of species poor grassland	 Nettle and hogweed interspersed within grassland
Photograph 3	**Photograph 4**
 Wilsons honeysuckle	 Path through wooded area of the LWS

A.42 River Shuttle SINC

A.42.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer platanoides	R	7
Acer pseudoplatanus	A	6
Alnus cordata	R	N/A
Betula pendula	R	4
Fraxinus excelsior	A	6
Populus alba	R	6
Prunus avium	R	6
Quercus ilex	R	4
Salix alba	R	8
Salix fragilis	O	7
Understorey		
Acer campestre	R	6
Acer platanoides	R	7
Buddleja davidii	R	5
Crataegus monogyna	F	6
Prunus avium	R	6
Prunus cerasifera	R	6
Prunus spinosa	R	6
Quercus ilex	O	4
Sambucus nigra	R	7
Field layer		
Achillea millefolium	R	4
Alliaria petiolata	O	8
Apium nodiflorum	R	7
Arctium minus	R	5
Arrhenatherum elatius	R	7
Brachypodium sylvaticum	O	5
Bromus sterilis	R	7
Calystegia sepium	R	7
Carex pendula	O	6
Carex remota	R	6
Cotoneaster horizontalis	R	4
Crataegus monogyna	O	6
Epilobium hirsutum	R	7
Festuca gigantea	R	7
Fraxinus excelsior	F	6
Geum urbanum	O	7
Hedera helix	F	6

Latin Name	DAFOR	Ellenberg value
Heracleum sphondylium	R	7
Hypericum perforatum	R	5
Impatiens glandulifera	O	7
Lycopus europaeus	R	6
Lythrum salicaria	R	5
Mentha aquatica	R	5
Oenanthe crocata	R	7
Parthenocissus quinquefolia	R	N/A
Persicaria maculosa	R	7
Pteridium aquilinum	O	3
Quercus ilex	O	4
Quercus robur	R	4
Rubus fruticosus	O	6
Rumex obtusifolius	R	9
Scrophularia auriculata	R	7
Sonchus asper	R	6
Sonchus oleraceus	R	7
Stachys palustris	R	7
Symphytum officinale	R	8
Urtica dioica	R	8

A.42.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer platanoides	1	7
Acer pseudoplatanus	9	6
Alnus cordata	1	N/A
Fraxinus excelsior	5	6
Populus alba	1	6
Prunus avium	1	6
Quercus ilex	1	4
Salix fragilis	5	7
Understorey		
Acer campestre	1	6
Acer platanoides	1	7
Crataegus monogyna	3	6
Quercus ilex	2	4
Sambucus nigra	1	7
Field layer		
Carex pendula	2	6

Latin Name	DOMIN	Ellenberg value
Crataegus monogyna	3	6
Fraxinus excelsior	1	6
Hedera helix	8	6
Rubus fruticosus	5	6

A.42.3 Habitat parcel 1

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	2	-
4	3	-
5	1	-
6	1	-
7	2	-
8	3	-
9	1	-
10	2	-
11	1	-
12	2	-
13	3	-
Total:	26 (Moderate)	

Photograph 1	Photograph 2
 Part channelled and culverted stream	 Abundant wetland plants along stream bed to the west.
Photograph 3	**Photograph 4**
 Riparian vegetation with frequent ivy pendulous sedge and some bramble after emerging west from beneath the road	 INNS present in small amount, including Himalayan balsam and cotoneaster

A.43 Shales More AW_LWS

A.43.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	A	6
Carpinus betulus	O	6
Fraxinus excelsior	F	6
Understorey		
Acer campestre	O	6
Carpinus betulus	F	
Corylus avellana	F	6
Crataegus monogyna	R	6
Prunus spinosa	O	6
Sambucus nigra	O	7
Field layer		
Arum maculatum	R	7
Brachypodium sylvaticum	F	5
cardamine flexuosa	R	6
Carex pendula	F	6
Chrysosplenium oppositifolium	R	5
Cirsium arvense	R	6
Dryopteris filix-mas	O	5
Glechoma hederacea	A	7
Holcus lanatus	R	5
Hyacinthoides non-scripta	A	6
Lolium perenne	O	6
Mercurialis perennis	F	7
Petroselinum segetum	R	6
Pteridium aquilinum	F	3
Pulicaria dysenterica	O	4
Rubus fruticosus	F	6
Rumex sanguineus	R	7
Silene dioica	R	7
stachys sylvatica	R	8
Urtica dioica	F	8

A.43.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer campestre	7	6
Carpinus betulus	3	6
Fraxinus excelsior	8	6
Understorey		
Corylus avellana	7	6
Field layer		
Dryopteris filix-mas	4	5
Galium aparine	4	8
Glechoma hederacea	4	7

Latin Name	DOMIN	Ellenberg value
Hyacinthoides non-scripta	4	6
Mercurialis perennis	4	7
Pteridium aquilinum	6	3
Rubus fruticosus	3	6
Urtica dioica	6	8

A.43.3 Condition assessment: Habitat parcel at 366_AW

Woodland criteria	Score	Comments
1	1	Only age class is 20 to 150 years
2	1	No regeneration
3	3	-
4	3	-
5	3	-
6	3	A number of open areas
7	1	No regeneration
8	1	Ash dieback
9	2	-
10	2	-
11	1	-
12	3	-
13	3	Arable crop adjacent but no signs of nutrient enrichment
Total:	27 (Moderate)	

A.43.4 Additional condition assessment notes: N/A

Shales More AW

Photograph 1	Photograph 2
 Old field maple present in the centre of the site	 Stream in wood is currently partially dry with no flow. Heavy trampling by deer around the stream has left a lot of bare ground
Photograph 3	**Photograph 4**
 Pendulous sedge dominant in wet hollow towards centre of the wood.	 Recently fallen ash

Photograph 5	Photograph 6
Old coppice, but no signs of recent management 	Temporary open space near the edge of the woodland fringed by quite large ash some with veteran features and signs of ash dieback. Ground layer dominated by bramble 

A.44 Shorne and Ashenbank Woods SSSI (includes Habitat parcels 1 to 8 of this SSSI)

A.44.1 Transect 1 (Habitat parcel 1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	F	6
Betula pendula	F	4
Fraxinus excelsior	O	6
Corylus avellana	R	6
Acer pseudoplatanus	O	6
Understorey		
Crataegus monogyna		6
Ilex aquifolium		5
Field layer		
Geum urbanum	O	7
Carex sylvatica	R	5
Hyacinthoides non-scripta	F	6
Arum maculatum	O	7
Dryopteris filix-mas	R	5
Lonicera periclymenum	R	5
Rubus fruticosus	F	6
Viola riviniana	O	4
Galium aparine	O	8

Latin Name	DAFOR	Ellenberg value
Epilobium sp	R	N/A
Poa annua	R	7
Agrostis stolonifera	R	6
Anemone nemorosa	R	4
Pteridium aquilinum	O	3
Dryopteris dilatata	R	5
Circaea lutetiana	O	6
Mercurialis perennis	O	7
Lysimachia nemorum	R	5
Lonicera periclymenum	O	5
Rumex sanguineus	O	7
Taraxacum agg	R	N/A
Hedera helix	LA	6
Veronica montana	O	6
Rhododendron sp	R	N/A
Pinus nigra	R	2
Brachypodium sylvaticum	R	5
Carex remota	R	6
Acer platanoides	R	7
Luzula forsteri	R	2
Fragaria vesca	R	4
Ajuga reptans	R	5
Ranunculus repens	R	7
Epilobium hirsutum	R	7
Dryopteris affinis	R	5

A.44.2 Quadrat 1 (Q1) in Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Carpinus betulus	8	6
Betula pendula	2	4
Quercus robur	5	4
Fraxinus excelsior	1	6
Understorey		
Acer pseudoplatanus		6
Ilex aquifolium		5
Hyacinthoides non-scripta		6
Bare ground and leaf litter		N/A
Field Layer		
Pteridium aquilinum		3
Rubus fruticosus		6
Hyacinthoides non-scripta		6
Mercurialis perennis		7
Dryopteris dilatata		5
Viola riviniana		4
Arum maculatum		7

A.44.3 Transect 2 (T2) Habitat parcel 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	O	6
Acer pseudoplatanus	O	6
Betula pendula	F	4
Carpinus betulus	F	6
Castanea sativa	F	5
Populus tremula	R	6
Prunus sp	R	#N/A
Salix caprea	LA	7
Castanea sativa	F	5
Understorey		
Ilex aquifolium	R	5
Prunus laurocerasus	R	6
Sambucus nigra	R	7
Rhododendron sp	O	#N/A
Cornus sanguinea	O	6
Field layer		
Rubus fruticosus	F	6
Carex sylvatica	O	5
Teucrium scorodonia	R	3
Juncus effusus	O	4
Lysimachia nemorum	R	5
Carex pendula	R	6
Euphorbia amygdaloides	R	6
Geum urbanum	R	7
Rumex sanguineus	R	7
Hyacinthoides non-scripta	R	6
Viola riviniana	R	4
Sonchus oleraceus	R	7
Lonicera periclymenum	LA	5
Pteridium aquilinum	O	3
Rosa sp	O	#N/A
Taraxacum agg	R	#N/A
Ranunculus repens	R	7
Festuca gigantea	R	7
Lolium perenne	O	6
Arum maculatum	O	7
Veronica chamaedrys	R	5
Epilobium sp	R	#N/A
Dryopteris filix-mas	LA	5
Fragaria vesca	R	4
Dryopteris dilatata	O	5
Acer platanoides	R	7
Luzula forsteri	O	2
Galium aparine	R	8

Latin Name	DAFOR	Ellenberg value
Heracleum sphondylium	R	7
Veronica montana	O	6
Ajuga reptans	R	5
Quercus robur	O	4
Vicia sepium	R	6
Prunella vulgaris	R	4
Brachypodium sylvaticum	O	5
Veronica serpyllifolia	R	5
Agrimonia eupatoria	R	4
Dactylorhiza fuchsii	R	3
Ranunculus bulbosus	R	4
Carex pendula	R	6
Potentilla reptans	R	5
Lotus corniculatus	R	2

A.44.4 Quadrat 2 (Q2) in Habitat parcel 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Salix caprea	5	7
Betula pendula	5	4
Quercus robur	3	4
Carpinus betulus	4	6
Castanea sativa	3	5
Understorey		
Taxus baccata	1	5
Rhododendron sp	4	#N/A
Field layer		
Teucrium scorodonia	4	3
Luzula forsteri	4	2
Juncus effusus	5	4
Carpinus betulus	1	6
Quercus robur	1	4
Viola riviniana	1	4
Holcus mollis	4	3
Chamaenerion angustifolium	2	5
Rubus fruticosus	1	6
Castanea sativa	1	5
Veronica serpyllifolia	1	5
Mosses	7	#N/A

A.44.5 Transect 3 (T3) covers Habitat parcels 3, 4 and 5.

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Acer campestre	O	6
Quercus robur	O	4
Carpinus betulus	O	6
Understorey		
Corylus avellana	O	6
Betula pendula	O	4
Ilex aquifolium	O	5
Acer pseudoplatanus	F	6
Field layer		
Hyacinthoides non-scripta	F	6
Rubus fruticosus	F	6
Dryopteris dilatata	R	5
Viola riviniana	R	4
Rumex sanguineus	O	7
Lonicera periclymenum	R	5
Fraxinus excelsior	O	6
Carex sylvatica	O	5
Holcus lanatus	O	5
Teucrium scorodonia	O	3
Lolium perenne	O	6
Taraxacum agg	R	#N/A
Ajuga reptans	O	5
Veronica serpyllifolia	R	5
Luzula forsteri	R	2
Fragaria vesca	R	4
Potentilla sterilis	O	5
Lysimachia nemorum	R	5
Anemone nemorosa	O	4
Mercurialis perennis	O	7
Arum maculatum	O	7
Circaea lutetiana	R	6
Acer campestre	O	6
Euphorbia amygdaloides	R	6
Carex pendula	R	6
Geum urbanum	R	7
Veronica montana	R	6
Dryopteris affinis	R	5

A.44.6 Quadrat Q3B, (lying within Habitat parcel 4, and along transect 3), and Quadrat Q3C, lying within Habitat parcel 5, and along transect 3)

Quadrat: Q3B		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Castanea sativa	7	5
Acer pseudoplatanus	4	6
Quercus robur	4	4
Betula pendula	5	4
Understorey		
None recorded		
Field layer		
Castanea sativa	1	5
Carpinus betulus	1	6
Rubus fruticosus	4	6
Hyacinthoides non-scripta	5	6
Lonicera periclymenum	4	5
Viola riviniana	2	4
Holcus lanatus	2	5
Teucrium scorodonia	1	3
Bare ground and leaf litter	8	#N/A
Quadrat: QT3C		
Canopy		
Castanea sativa	8	5
Quercus robur	5	4
Acer pseudoplatanus	4	6
Acer campestre	3	6
Betula pendula	4	4
Understorey		
Sambucus nigra	1	7
Field layer		
Circaea lutetiana	4	6
Mercurialis perennis	5	7
Rubus fruticosus	3	6
Lolium perenne	1	6
Leaf litter	7	#N/A
Bare ground	4	#N/A
Bryophytes	4	#N/A

A.44.7 Transect 4 (Habitat parcel 6)

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	*R*	*6*
Acer pseudoplatanus	*O*	*6*
Betula pendula	*R*	*4*
Castanea sativa	*A*	*5*
Acer platanoides	*R*	*7*
Crataegus monogyna	*O*	*6*
Understorey		
Ilex aquifolium	*R*	*5*
Ligustrum vulgare	*O*	*5*
Cornus sanguinea	*O*	*6*
Ribes sp	*R*	*#N/A*
Carpinus betulus	*O*	*6*
Field layer		
Anemone nemorosa	*O*	*4*
Lonicera periclymenum	*R*	*5*
Hedera helix	*F*	*6*
Mercurialis perennis	*F*	*7*
Euphorbia amygdaloides	*R*	*6*
Rubus fruticosus	*F*	*6*
Galium aparine	*F*	*8*
Ficaria verna	*R*	*6*
Circaea lutetiana	*O*	*6*
Arum maculatum	*R*	*7*
Urtica dioica	*R*	*8*
Orchis mascula	*O*	*4*
Veronica chamaedrys	*R*	*5*
Viola riviniana	*O*	*4*
Geum urbanum	*R*	*7*

A.44.8 Quadrat 4 (Q4) Habitat parcel 6

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	8	5
Quercus robur	1	4
Betula pendula	1	4
Acer pseudoplatanus	5	6
Fraxinus excelsior	*1*	6
Acer campestre	*1*	6
Carpinus betulus	*4*	6
Understorey		
Corylus avellana	1	6
Ligustrum vulgare	3	5
Crataegus monogyna	3	6
Cornus sanguinea	4	6
Field Layer		
Rubus fruticosus	4	6
Galium aparine	4	8
Mercurialis perennis	5	7
Hedera helix	7	6
Lonicera periclymenum	1	5
Arum maculatum	1	7
Prunus sp	1	#N/A
Bare ground/ leaf litter	6	#N/A

A.44.9 Transect 5 (Habitat parcel 7)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Betula pendula	O	4
Acer pseudoplatanus	O	6
Quercus petraea	R	4
Understorey		
Lonicera periclymenum	O	5
Ilex aquifolium	F	5
Buddleja	O	N/A
Rosa sp	R	N/A
Field layer		
Rubus fruticosus	A	6
Viola sp.	R	N/A
Lysimachia nemorum	R	5
Pteridium aquilinum	F	3
Holcus mollis	O	3
Rhododendron	O	N/A
Deschampsia cespitosa	O	4

Latin Name	DAFOR	Ellenberg value
Poa trivialis	F	6
Dryopteris dilatata	F	5
Digitalis purpurea	R	5
Holcus lanatus	R	5
Teucrium scorodonia	R	3
Juncus effusus	R	4
Cirsium vulgare	R	6
Dryopteris filix-mas	R	5
Carex pendula	R	6
Epilobium hirsutum	R	7
Carex sylvatica	R	5
Ribes uva-crispa	R	6

A.44.10 Quadrat for Transect 5 (Habitat parcel 7)

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus petraea	3	4
Castanea sativa	9	5
Betula pendula	3	4
Understorey		
Sambucus nigra	2	7
Field layer		
Galium aparine	8	8
Rubus fruticosus	8	6
Urtica dioica	4	8
Dryopteris filix-mas	1	5
Ribes uva-crispa	2	6

A.44.11 Transect 6 (Habitat parcel 8)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Acer pseudoplatanus	F	6
Betula pendula	F	4
Quercus petraea	O	4
Fraxinus excelsior	O	6
Prunus avium	R	6
Understorey		
Ilex aquifolium	F	5
Sambucus nigra	F	7
Crataegus monogyna	F	6
Taxus baccata	R	5
Fagus sylvatica	R	5

Latin Name	DAFOR	Ellenberg value
Clematis vitalba	R	5
Salix cinerea	R	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Ligustrum vulgare	R	
Carpinus betulus	R	
Quercus ilex	R	
Field layer		
Urtica dioica	F	8
Rubus fruticosus	A	6
Hyacinthoides non-scripta	F	6
Pteridium aquilinum	F	3
Rumex sanguineus	O	7
Rumex obtusifolius	O	9
Holcus lanatus	O	5
Dryopteris dilatata	O	5
Dryopteris filix-mas	R	5
Carex sylvatica	O	5
Brachypodium sylvaticum	O	5
Fraxinus excelsior	O	6
Circaea lutetiana	F	6
Iris foetidissima	R	5
Mercurialis perennis	O	7
Athyrium filix-femina	R	6
Glechoma hederacea	O	7
Ranunculus repens	O	7
Galium aparine	O	8
Daphne laureola	R	5
Geranium robertianum	R	6
Silene dioica	R	7
Chamaenerion angustifolium	R	5
Solidago canadensis	R	6
Poa trivialis	F	6
Arctium lappa	R	9
Carex remota	R	6
Geum urbanum	R	7

A.44.12 Quadrat for Transect 6 (Habitat parcel 8)

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus petraea	5	4
Castanea sativa	4	5
Carpinus betulus	3	6
Fraxinus excelsior	4	6
Acer pseudoplatanus	4	6
Understorey		
Crataegus monogyna	4	6
Field layer		
Mercurialis perennis	6	7
Urtica dioica	6	8
Rubus fruticosus	3	6
Galium aparine	1	8
Poa trivialis	3	6
Geum urbanum	1	7

A.44.13 Shorne and Ashenbank Woods SSSI

A.44.14 Condition assessment: Transect 1 (Habitat parcel 1)

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	1	-
4	3	-
5	1	-
6	1	-
7	3	-
8	3	-
9	3	-
10	2	-
11	1	-
12	2	-
13	2	-
Total:	27 (Moderate)	

A.44.15 Condition assessment: Transect 2 (Habitat parcel 2)

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	1	-
4	3	-
5	1	-
6	1	-
7	3	-
8	3	-
9	3	-

Woodland criteria	Score	Comments
10	2	-
11	1	-
12	2	-
13	2	-
Total:	27 (Moderate)	

A.44.16 Condition assessment: Transect 3 (Habitat parcels 3, 4 and 5)

Woodland criteria	Score	Comments
1	2	-
2	3	-
3	3	-
4	3	-
5	1	-
6	1	-
7	2	-
8	3	-
9	3	-
10	2	-
11	1	-
12	2	-
13	3	-
Total:	29 (Moderate)	

A.44.17 Condition assessment: Transect 4 (Habitat parcel 6)

Woodland criteria	Score	Comments
1	3	-
2	3	-
3	3	-
4	3	-
5	1	-
6	1	-
7	2	-
8	3	-
9	3	-
10	2	-
11	2	-
12	3	-
13		Condition assessment incomplete, no value for criterion 13. Woodland still moderate regardless.
Total:	29 (Moderate)	

A.44.18 Condition assessment: Transect 5 (Habitat parcel 7)

Woodland criteria	Score	Comments
1	2	-
2	2	-
3	1	-

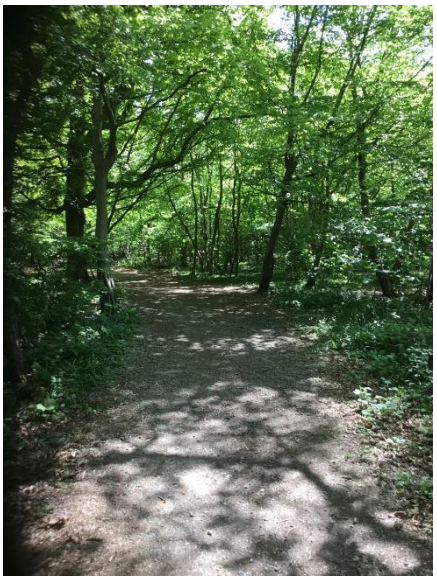
Woodland criteria	Score	Comments
4	3	-
5	2	-
6	3	-
7	2	-
8	3	-
9	3	-
10	2	-
11	2	-
12	2	-
13	3	-
Total:	30 (Moderate)	

A.44.19 Condition assessment: Transect 6 (Habitat parcel 8)

Woodland criteria	Score	Comments
1	3	-
2	3	-
3	3	-
4	3	-
5	3	-
6	2	-
7	3	-
8	2	-
9	3	-
10	2	-
11	3	-
12	2	-
13	3	-
Total:	35 (Good)	

A.44.20 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Relatively bare ground with beech stands and some interspersed conifers	 Area of recent clearing showing exceptional regeneration diversity in ground flora and indicating active management
Photograph 3	**Photograph 4**
 Area of recent coppice	 Rhododendron saplings

Photograph 5	Photograph 6
 Cherry laurel saplings	 Dogs mercury carpet amongst nettle and bramble
Photograph 7	**Photograph 8**
 Cleared path through areas of woodland	 Stands of semi mature trees with some bluebells amongst bare ground

Photograph 9	Photograph 10
 Common spotted orchid present within woodland	 Mature oak tree

A.45 Shorne/Brewers AW (includes Habitat parcels 2, 4, 5, 6 and 7 of Shorne and Ashenbank Woods SSSI)

A.45.1 Transect 3 (T3) covers Habitat parcels 3, 4 and 5

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Acer campestre	O	6
Quercus robur	O	4
Carpinus betulus	O	6
Understorey		
Corylus avellana	O	6
Betula pendula	O	4
Ilex aquifolium	O	5
Acer pseudoplatanus	F	6
Field layer		
Hyacinthoides non-scripta	F	6
Rubus fruticosus	F	6
Dryopteris dilatata	R	5
Viola riviniana	R	4
Rumex sanguineus	O	7
Lonicera periclymenum	R	5
Fraxinus excelsior	O	6
Carex sylvatica	O	5
Holcus lanatus	O	5
Teucrium scorodonia	O	3
Lolium perenne	O	6
Taraxacum agg	R	#N/A
Ajuga reptans	O	5
Veronica serpyllifolia	R	5
Luzula forsteri	R	2
Fragaria vesca	R	4
Potentilla sterilis	O	5
Lysimachia nemorum	R	5
Anemone nemorosa	O	4
Mercurialis perennis	O	7
Arum maculatum	O	7
Circaea lutetiana	R	6
Acer campestre	O	6
Euphorbia amygdaloides	R	6
Carex pendula	R	6
Geum urbanum	R	7
Veronica montana	R	6
Dryopteris affinis	R	5

A.45.2 Quadrat Q3B, (lying within Habitat parcel 4, and along transect 3), and Quadrat Q3C, lying within Habitat parcel 5, and along transect 3)

Quadrat: Q3B		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Castanea sativa	7	5
Acer pseudoplatanus	4	6
Quercus robur	4	4
Betula pendula	5	4
Understorey		
None recorded		
Field layer		
Castanea sativa	1	5
Carpinus betulus	1	6
Rubus fruticosus	4	6
Hyacinthoides non-scripta	5	6
Lonicera periclymenum	4	5
Viola riviniana	2	4
Holcus lanatus	2	5
Teucrium scorodonia	1	3
Bare ground and leaf litter	8	#N/A
Quadrat: Q3C		
Canopy		
Castanea sativa	8	5
Quercus robur	5	4
Acer pseudoplatanus	4	6
Acer campestre	3	6
Betula pendula	4	4
Understorey		
Sambucus nigra	1	7
Field		
Circaea lutetiana	4	6
Mercurialis perennis	5	7
Rubus fruticosus	3	6
Lolium perenne	1	6
Leaf litter	7	#N/A
Bare ground	4	#N/A
Bryophytes	4	#N/A

A.45.3 Transect 4 (Habitat parcel 6)

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Fraxinus excelsior	*R*	*6*
Acer pseudoplatanus	*O*	*6*
Betula pendula	*R*	*4*

Latin Name	DAFOR	Ellenberg value
Castanea sativa	*A*	*5*
Acer platanoides	*R*	*7*
Crataegus monogyna	*O*	*6*
Understorey		
Ilex aquifolium	*R*	*5*
Ligustrum vulgare	*O*	*5*
Cornus sanguinea	*O*	*6*
Ribes sp	*R*	*#N/A*
Carpinus betulus	*O*	*6*
Field		
Anemone nemorosa	*O*	*4*
Lonicera periclymenum	*R*	*5*
Hedera helix	*F*	*6*
Mercurialis perennis	*F*	*7*
Euphorbia amygdaloides	*R*	*6*
Rubus fruticosus	*F*	*6*
Galium aparine	*F*	*8*
Ficaria verna	*R*	*6*
Circaea lutetiana	*O*	*6*
Arum maculatum	*R*	*7*
Urtica dioica	*R*	*8*
Orchis mascula	*O*	*4*
Veronica chamaedrys	*R*	*5*
Viola riviniana	*O*	*4*
Geum urbanum	*R*	*7*

A.45.4 Quadrat 4 (Q4) Habitat parcel 6

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	8	5
Quercus robur	1	4
Betula pendula	1	4
Acer pseudoplatanus	5	6
Fraxinus excelsior	*1*	6
Acer campestre	*1*	6
Carpinus betulus	*4*	6
Understorey		
Corylus avellana	1	6
Ligustrum vulgare	3	5
Crataegus monogyna	3	6
Cornus sanguinea	4	6
Field Layer		
Rubus fruticosus	4	6
Galium aparine	4	8
Mercurialis perennis	5	7

Latin Name	DOMIN	Ellenberg value
Hedera helix	7	6
Lonicera periclymenum	1	5
Arum maculatum	1	7
Prunus sp	1	#N/A
Bare ground/ leaf litter	6	#N/A

A.45.5 Transect 5 (Habitat parcel 7)

Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Betula pendula	O	4
Acer pseudoplatanus	O	6
Quercus petraea	R	4
Understorey		
Lonicera periclymenum	O	5
Ilex aquifolium	F	5
Buddleja	O	N/A
Rosa sp	R	N/A
Field layer		
Rubus fruticosus	A	6
Viola sp.	R	N/A
Lysimachia nemorum	R	5
Pteridium aquilinum	F	3
Holcus mollis	O	3
Rhododendron	O	N/A
Deschampsia cespitosa	O	4
Poa trivialis	F	6
Dryopteris dilatata	F	5
Digitalis purpurea	R	5
Holcus lanatus	R	5
Teucrium scorodonia	R	3
Juncus effusus	R	4
Cirsium vulgare	R	6
Dryopteris filix-mas	R	5
Carex pendula	R	6
Epilobium hirsutum	R	7
Carex sylvatica	R	5
Ribes uva-crispa	R	6

A.45.6 Quadrat for Transect 5 (Habitat parcel 7)

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus petraea	3	4
Castanea sativa	9	5
Betula pendula	3	4
Understorey		
Sambucus nigra	2	7
Field layer		
Galium aparine	8	8
Rubus fruticosus	8	6
Urtica dioica	4	8
Dryopteris filix-mas	1	5
Ribes uva-crispa	2	6

A.45.7 Transect 6 (Habitat parcel 8)

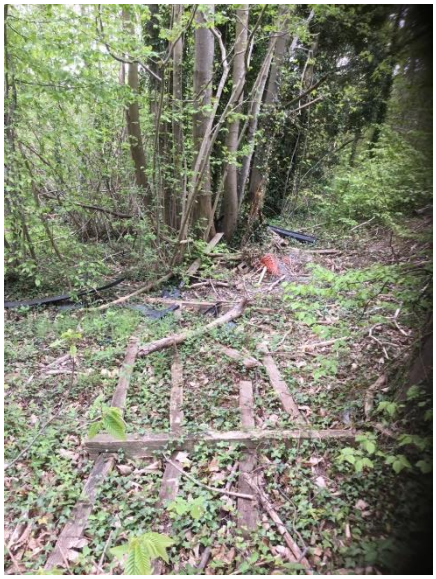
Latin Name	DAFOR	Ellenberg value
Canopy		
Castanea sativa	A	5
Acer pseudoplatanus	F	6
Betula pendula	F	4
Quercus petraea	O	4
Fraxinus excelsior	O	6
Prunus avium	R	6
Understorey		
Ilex aquifolium	F	5
Sambucus nigra	F	7
Crataegus monogyna	F	6
Taxus baccata	R	5
Fagus sylvatica	R	5
Clematis vitalba	R	5
Salix cinerea	R	5
Cornus sanguinea	R	6
Corylus avellana	F	6
Ligustrum vulgare	R	
Carpinus betulus	R	
Quercus ilex	R	
Field		
Urtica dioica	F	8
Rubus fruticosus	A	6
Hyacinthoides non-scripta	F	6
Pteridium aquilinum	F	3
Rumex sanguineus	O	7
Rumex obtusifolius	O	9
Holcus lanatus	O	5

Latin Name	DAFOR	Ellenberg value
Dryopteris dilatata	O	5
Dryopteris filix-mas	R	5
Carex sylvatica	O	5
Brachypodium sylvaticum	O	5
Fraxinus excelsior	O	6
Circaea lutetiana	F	6
Iris foetidissima	R	5
Mercurialis perennis	O	7
Athyrium filix-femina	R	6
Glechoma hederacea	O	7
Ranunculus repens	O	7
Galium aparine	O	8
Daphne laureola	R	5
Geranium robertianum	R	6
Silene dioica	R	7
Chamaenerion angustifolium	R	5
Solidago canadensis	R	6
Poa trivialis	F	6
Arctium lappa	R	9
Carex remota	R	6
Geum urbanum	R	7

A.45.8 Quadrat for Transect 6 (Habitat parcel 8)

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus petraea	5	4
Castanea sativa	4	5
Carpinus betulus	3	6
Fraxinus excelsior	4	6
Acer pseudoplatanus	4	6
Understorey		
Crataegus monogyna	4	6
Field		
Mercurialis perennis	6	7
Urtica dioica	6	8
Rubus fruticosus	3	6
Galium aparine	1	8
Poa trivialis	3	6
Geum urbanum	1	7

Photograph 1	Photograph 2
 Relatively bare ground with beech stands and some interspersed conifers	 Area of recent clearing showing exceptional regeneration diversity in ground flora and indicating active management
Photograph 3	**Photograph 4**
 Area of recent coppice	 Dense bramble and cleavers ground flora

Photograph 5	Photograph 6
 Damaged ground	 Cherry laurel sapling
Photograph 7	**Photograph 8**
 Cleared path through areas of woodland	 Nitrogen tolerant lichens present on site

Photograph 9	Photograph 10
 Common spotted orchid present within woodland	 Veteran tree

A.46 Strawberry Farm Wood SINC

A.46.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Quercus robur	F	4
Sorbus torminalis	R	5
Fraxinus excelsior	F	6
Ulmus procera	R	6
Acer pseudoplatanus	O	6
Understorey		
Prunus spinosa	F	6
Fraxinus excelsior	F	6
Ulmus sp.	O	N/A
Sambucus nigra	F	7
Crataegus monogyna	F	6
Acer pseudoplatanus	O	6
Ilex aquifolium	R	5
Euonymus europaeus	R	5
Taxus baccata	R	5
Field layer		
Urtica dioica	O	8
Hedera helix	F	6
Hyacinthoides non-scripta	O	6

Latin Name	DAFOR	Ellenberg value
Canopy		
Anthriscus sylvestris	O	7
Rubus fruticosus	F	6
Holcus lanatus	R	5
Dryopteris filix-mas	R	5
Dryopteris dilatata	R	5
Alliaria petiolata	R	8
Galium aparine	O	8
Pteridium aquilinum	O	3
Silene dioica	F	7
Arum maculatum	R	7
Ilex aquifolium	R	5
Ulmus sp.	O	N/A
Acer campestre	R	6
Tamus communis	R	6
Rosa sp.	R	N/A
Robinia pseudoacacia	R	6
Geum urbanum	R	7
Arrhenatherum elatius	R	7
Senecio jacobaea	R	4
Geranium robertianum	O	6
Stellaria media	L/A	7
Mercurialis perennis	R	7
Brachypodium pinnatum	R	3
Rumex sanguineus	R	7
Prunella vulgaris	R	4
Ribes rubrum	R	6
Lamiastrum galeobdolon	R	6

A.46.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus robur	4	4
Fraxinus excelsior	7	6
Ulmus procera	3	6
Acer pseudoplatanus	3	6
Understorey		
Sambucus nigra	4	7
Ilex aquifolium	2	5
Taxus baccata	1	5
Prunus spinosa	6	6
Crataegus monogyna	7	6
Ulmus sp.		N/A
Field layer		

Latin Name	DOMIN	Ellenberg value
Rubus fruticosus	6	6
Dryopteris filix-mas	1	5
Euonymus europaeus	1	5
Hedera helix	5	6
Stachys sylvatica	1	8
Geum urbanum	1	7
Fraxinus excelsior	1	6
Prunus spinosa	3	6

A.46.3 Condition assessment: Habitat parcel at 274_AW

Woodland criteria	Score	Comments
1	2	-
2	3	Some horse grazing but no damage
3	3	-
4	3	Diverse
5	3	A little sycamore but not much
6	1	No open space (and less than 10ha)
7	3	-
8	3	-
9	3	A few AWI's
10	3	Good structure
11	1	-
12	2	-
13	3	No signs
Total:	33 (Good)	

A.46.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Mature and semi mature stands among bare ground	 Evidence of dog walking
Photograph 3	**Photograph 4**
 Large amount of collected deadwood	 Relatively dense bramble ground flora

A.47 Thames Chase Forest Centre SINC

A.47.1 Transect in Habitat parcel 1 (woodland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer campestre	*O*	6
Betula pendula	*R*	4
Carpinus betulus	*F*	6
Castanea sativa	*R*	5
Fraxinus excelsior	*O*	6
Pinus sylvestris	*R*	2
Prunus cerasifera	*R*	6
Quercus robur	*F*	4

Latin Name	DAFOR	Ellenberg value
Salix alba	*R*	8
Salix caprea	*O*	7
Sorbus aucuparia	*R*	4
Sorbus torminalis	*R*	5
Taxus baccata	*R*	5
Tilia sp.	*F*	N/A
Understorey		
Cornus sanguinea	*F*	6
Corylus avellana	*F*	6
Crataegus monogyna	*O*	6
Euonymus europaeus	*O*	5
Ligustrum vulgare	*R*	5
Viburnum opulus	*O*	6
Field layer		
Agrostis capillaris	*O*	4
Arrhenatherum elatius	*R*	7
Cirsium arvense	*O*	6
Cirsium vulgare	*R*	6
Dryopteris filix-mas	*R*	5
Festuca rubra	*O*	5
Galium aparine	*R*	8
Galium mollugo	*R*	4
Geum urbanum	*R*	7
Glechoma hederacea	*R*	7
Picris echioides	O	6
Holcus lanatus	O	5
Juncus inflexus	R	5
Lolium perenne	R	6
Malus sylvestris	R	6
Myosotis arvensis	O	6
Poa compressa	O	4
Prunella vulgaris	R	4
Pulicaria dysenterica	O	4
Rubus fruticosus	F	6
Rumex sanguineus	F	7
Jacobaea vulgaris	O	4
Solidago canadensis	LF	6
Taraxacum officinale agg.	R	6
Tragopogon pratensis	R	5
Urtica dioica	LA	8
Veronica chamaedrys	R	5
Veronica serpyllifolia	R	5
Vicia sp.	R	N/A

Quadrat 1 in Habitat parcel 1		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Carpinus betulus	*3*	6
Quercus robur	*7*	4
Acer campestre	*7*	6
Fraxinus excelsior	*4*	6
Sorbus torminalis	*1*	5
Castanea sativa	*1*	5
Understorey		
Viburnum opulus	*2*	6
Prunus spinosa	*5*	6
Corylus avellana	*2*	6
Sorbus aucuparia	*1*	4
Prunus cerasifera	*1*	6
Salix caprea	*1*	7
Crataegus monogyna	*4*	6
Euonymus europaeus	*3*	5
Field layer		
Viburnum opulus	*1*	6
Crataegus monogyna	*2*	6
Acer campestre	*2*	6
Castanea sativa	*1*	5
Rubus fruticosus	*4*	6
Holcus lanatus	*2*	5
Vicia sp.	*1*	N/A
Galium aparine	*1*	8
Rumex sanguineus	*2*	7
Prunella vulgaris	1	4
Poa compressa	2	4
Festuca rubra	1	5
Arrhenatherum elatius	1	7
Quadrat 2 in Habitat parcel 1		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Fraxinus excelsior	7	6
Quercus robur	5	4
Understorey		
Corylus avellana	9	6
Euonymus europaeus	3	5
Field layer		
Fraxinus excelsior	3	6
Crataegus monogyna	1	6
Prunus spinosa	1	6
Rosa sp.	1	N/A
Urtica dioica	4	8
Rubus fruticosus	1	6

Lolium perenne	1	6
Geum urbanum	1	7
Glechoma hederacea	1	7
Veronica chamaedrys	1	5
Taraxacum officinale agg.	1	6

A.47.2 Transect in Habitat parcel 2 (woodland)

Latin Name	**DAFOR**	**Ellenberg value**
Canopy		
Acer campestre	*O*	6
Alnus glutinosa	*LA*	6
Betula pendula	*O*	4
Crataegus monogyna	*F*	6
Quercus ilex	*O*	4
Quercus robur	*O*	4
Quercus rubra	*LF*	N/A
Salix caprea	*O*	7
Salix sp.	*O*	N/A
Salix viminalis	*O*	6
Sorbus torminalis	*R*	5
Ulmus sp.	*O*	N/A
Fraxinus excelsior	*O*	6
Ilex aquifolium	*O*	5
Larix decidua	*O*	3
Pinus sylvestris	*LA*	2
Populus sp.	*LA*	N/A
Populus tremula	*O*	6
Understorey		
Corylus avellana	*O*	6
Cornus sanguinea	*F*	6
Viburnum opulus	*O*	6
Euonymus europaeus	*F*	5
Field layer		
Anthryscus sylvestris	O	7
Arrhenatherum elatius	O	7
Agrimonia eupatoria	R	4
Cardamine hirsuta	R	6
Cirsium arvense	O	6
Daucus carota	O	8
Dipsacus fullonum	LF	7
Epilobium hirsutum	O	7
Epilobium sp.	O	N/A
Festuca rubra	O	5
Galium aparine	O	8
Geranium dissectum	R	6
Holcus lanatus	F	5

Latin Name	DAFOR	Ellenberg value
Canopy		
Hypericum hirsutum	LF	5
Lolium perenne	F	6
Malus sp.	R	N/A
Moss	F	N/A
Pimpinella major	O	6
Poa compressa	F	4
Poa trivialis	O	6
Potentilla reptans	F	5
Prunus padus	R	7
Prunus spinosa	F	6
Pulicaria dysenterica	O	4
Ranunculus acris	R	4
Rosa sp.	F	N/A
Rubus fruticosus	F	6
Rumex sanguineus	F	7
Jacobaea vulgaris	O	4
Solidago canadensis	LF	6
Vicia hirsuta	R	6
Vicia sp.	O	N/A

Quadrat 3 in Habitat parcel 2 (woodland)		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Populus tremula		6
Malus sp.	*1*	N/A
Alnus glutinosa	*4*	6
Ilex aquifolium	*2*	5
Sorbus torminalis	*4*	5
Quercus robur	*3*	4
Salix viminalis	*6*	6
Understorey		
Prunus spinosa	*4*	6
Viburnum opulus	*1*	6
Rosa sp.	*1*	N/A
Field layer		
Prunus spinosa	*4*	6
Cornus sanguinea	*2*	6
Rumex sanguineus	*2*	7
Rubus fruticosus	*3*	6
Anthriscus sylvestris	*1*	7
Solidago canadensis	*2*	6
Crataegus monogyna	*1*	6
Pulicaria dysenterica	*1*	4
Lolium perenne	*5*	6

Quadrat 3 in Habitat parcel 2 (woodland)		
Holcus lanatus	*1*	5
Cirsium vulgare	1	6
Vicia hirsuta	1	6
Poa trivialis	3	6
Cirsium arvense	1	6
Pimpinella major	3	6
Quercus ilex	1	4
Acer campestre	1	6

Quadrat 4 in Habitat parcel 2		
Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Salix sp.	4	N/A
Populus sp.	3	N/A
Fraxinus excelsior	2	6
Salix caprea	2	7
Crataegus monogyna	2	6
Quercus robur	4	4
Pinus sylvestris	2	2
Betula pendula	*1*	4
Larix decidua	*2*	3
Understorey		
Euonymus europaeus	3	5
Rosa sp.	1	N/A
Prunus spinosa	3	6
Acer campestre	*2*	6
Corylus avellana	*1*	6
Cornus sanguinea	*4*	6
Field layer		
Potentilla reptans	4	5
Fraxinus excelsior	4	6
Vicia sp.	1	N/A
Solidago canadensis	3	6
Hypericum hirsutum	4	5
Crataegus monogyna	2	6
Rubus fruticosus	4	6
Anthriscus sylvestris	2	7
Acer campestre	1	6
Galium aparine	1	8
Festuca rubra	1	5
Epilobium sp.	1	N/A
Pulicaria dysenterica	1	4
Lolium perenne	4	6
Geranium dissectum	1	6
Ranunculus acris	1	4

A.47.3 Transect in Habitat parcel 3 (grassland)

Latin Name	DAFOR	Ellenberg value
Canopy		
Salix caprea	*O*	7
Prunus spinosa	*F*	6
Cornus sanguinea	*F*	6
Euonymus europaeus	*F*	5
Rosa sp.	*F*	N/A
Fraxinus excelsior	*R*	6
Acer campestre	*O*	6
Malus sp.	*O*	N/A
Field layer		
Agrimonia eupatoria	R	4
Helminthotheca echioides	O	N/A
Dipsacus fullonum	O	7
Rubus fruticosus	F	6
Senecio jacobea	F	N/A
Holcus lanatus	A	5
Epilobium sp.	O	N/A
Poa compressa	O	4
Festuca rubra	F	5
Cirsium arvense	O	6
Pulicaria dysenterica	R	4
Vicia sativa	F	4
Epilobium hirsutum	O	7
Taraxacum agg	O	N/A
Cirsium vulgaris	O	N/A
Trifolium repens	O	6
Plantago media	R	3
Prunella vulgaris	R	4
Poa annua	O	7
Lolium perenne	O	6
Ulmus sp.	R	N/A
Plantago major	R	7
Anthriscus sylvestris	R	7
Urtica dioica	LA	8
Lamium album	O	8
Arrhenatherum elatius	F	7
Galium aparine	R	8
Potentilla reptans	O	5
Sonchus oleraceus	R	7
Daucus carota	R	8
Cerastium fontanum	O	4
Geranium dissectum	O	6
Rosa canina	R	6
Anagallis arvensis	R	5

Barbarea vulgaris	R	8
Rumex crispus	LA	6
Bromus sterilis	R	7
Stellaria holostea	O	6
Calystegia sepium	R	7
Myosotis arvensis	R	6
Arum maculatum	R	7
Vicia hirsuta	O	6
Dactylis glomerata	F	6
Lamium purpureum	R	7
Medicago arabica	O	5
Veronica persica	R	7
Alliaria petiolata	R	8
Galium mollugo	R	4
Plantago lanceolata	R	4
Arctium lappa	R	9
Geum urbanum	R	7
Hypericum perforatum	LF	5
Hypericum hirsutum	R	5
Equisetum arvense	R	6
Heracleum sphondylium	R	7
Centaurea nigra	LF	5
Ranunculus acris	F	4
Poa pratensis	LF	5
Pimpinella major	R	6
Anthoxanthum odoratum	O	3
Alopecurus pratensis	O	7
Ranunculus repens	LF	7

A.47.4 Quadrat 5 in Habitat parcel 3 (grassland)

Latin Name	**DOMIN**	**Ellenberg value**
Field layer		
Agrimonia eupatoria	*1*	4
Picris echioides	*2*	6
Dipsacus fullonum	*3*	7
Rubus fruticosus	*3*	6
Jacobaea vulgaris	*2*	4
Holcus lanatus	*5*	5
Prunus spinosa	*4*	6
Epilobium sp.	*1*	N/A
Poa compressa	*5*	4
Festuca rubra	*5*	5
Cirsium arvense	1	6
Pulicaria dysenterica	4	4
Vicia sativa	1	4

A.47.5 Condition assessment: Habitat parcel 1 WDLD at 267_AW

Woodland criteria	Score	Comments
1	1	Sometimes two classes but not consistently
2	3	No signs
3	2	One *Rosa rugosa* recorded
4	3	-
5	3	-
6	3	Less than 10%
7	2	Only 1 or 2 classes present
8	3	Ash dieback present but less than 10% of overall canopy
9	1	-
10	2	Sometimes two storeys but not consistently
11	1	-
12	1	-
13	3	-
Total:	28 (Moderate)	

A.47.6 Condition assessment: Habitat parcel 2 WDLW at 268_AW

Woodland criteria	Score	Comments
1	1	In general, no trees present older than about 20 years
2	3	No evidence of browsing
3	3	No invasives
4	3	-
5	3	Predominantly native
6	3	Less than 10% open space
7	2	Some regeneration present
8	3	Ash being impacted but less than 10% of overall canopy
9	1	-
10	1	Two storeys present in some areas but inconsistently
11	1	-
12	1	Almost none
13	3	No enrichment or damaged ground
Total:	28 (**MODERATE)**	

A.47.7 Condition assessment: Habitat parcel 3 GSLD at 266_AW

Woodland criteria	Score	Comments
1	No	Generally, quite species poor
2	Yes	Sward height variable
3	Yes	Small patches of bare ground
4	No	Scrub well over 5% cover in places

5	Yes	-
6	No	Generally, less than 9 species
Total:	Poor	

A.47.8 **Additional condition assessment notes**: None

Photograph 1	**Photograph 2**
 Area of open grassland which gets mown	 Young natural style orchard, some with tree guards
Photograph 3	**Photograph 4**
 Discarded tree guards after removal	 Area of dense scrub between woodland and grassland areas

Photograph 5	Photograph 6
 Plantation with almost no surrounding ground flora	 Bluebells among old coppice

Photograph 7
 Larch trees in mixed mainly decidious woodland

A.48 The Selvage LWS

A.48.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Fraxinus excelsior	A	6
Quercus robur	F	4
Understorey		
Corylus avellana	O	6
Crataegus monogyna	O	6
Ulmus minor	F	7
Field		
Alliaria petiolata	O	8
Arrhenatherum elatius	O	7
Arum maculatum	R	7
Brachypodium sylvaticum	A	5
Dactylis glomerata	O	6
Deschampsia cespitosa	F	4
Holcus lanatus	O	5
Mercurialis perennis	O	7
Poa trivialis	F	6
Rubus fruticosus	R	6
Urtica dioica	R	8

A.48.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Fraxinus excelsior	7	6
Quercus robur	6	4
Understorey		
Corylus avellana	1	6
Crataegus monogyna	2	6
Ulmus minor	4	7
Field layer		
Alliaria petiolata	2	8
Arrhenatherum elatius	4	7
Brachypodium sylvaticum	4	5
Dactylis glomerata	2	6
Deschampsia cespitosa	1	4
Poa trivialis	6	6
Rubus fruticosus	1	6

A.48.3 Transect 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	O	6
Alnus glutinosa	O	6
Carpinus betulus	O	6
Fagus sylvatica	R	5
Fraxinus excelsior	A	6
Quercus robur	O	4
Understorey		
Crataegus monogyna	O	6
Prunus avium	O	6
Sambucus nigra	R	7
Field layer		
Arrhenatherum elatius	A	7
Arum maculatum	R	7
Brachypodium sylvaticum	A	5
Cirsium vulgare	R	6
Conium maculatum	R	8
Crataegus monogyna	R	6
Dipsacus fullonum	O	7
Fraxinus excelsior	O	6
Galega officinalis	O	8
Holcus lanatus	F	5
Petroselinum segetum	R	6
Pteridium aquilinum	R	3
Pulicaria dysenterica	R	4
Rosa arvensis	R	5
Rubus fruticosus	A	6
Rumex sanguineus	R	7
Silene dioica	R	7
Urtica dioica	R	8

A.48.4 Quadrat 2

Latin Name	DOMIN	Ellenberg value
Canopy		
Alnus glutinosa	3	6
Carpinus betulus	5	6
Fagus sylvatica	1	5
Fraxinus excelsior	6	6
Quercus robur	4	4
Understorey		
Crataegus monogyna	2	6
Prunus avium	2	6
Sambucus nigra	1	7
Field layer		
Arrhenatherum elatius	6	7
Brachypodium sylvaticum	6	5
Crataegus monogyna	1	6
Dipsacus fullonum	2	7

Latin Name	DOMIN	Ellenberg value
Petroselinum segetum	1	6
Plantago lanceolata	6	4
Pulicaria dysenterica	1	4
Rumex sanguineus	1	7
Urtica dioica	1	8

A.48.5 Condition assessment: Habitat parcel at 507_LWS

Woodland criteria	Score	Comments
1	1	Plantation, trees ranging 10-30cm DBH
2	3	-
3	3	-
4	3	-
5	3	-
6	3	-
7	2	-
8	1	Ash dieback
9	1	-
10	1	-
11	1	-
12	3	-
13	2	-
Total:	27 (Moderate)	

A.48.6 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 A previously established open remnant of ash woodland 50 cm DBH with some oak and elm	 Hazel present in the understorey
Photograph 3	**Photograph 4**
 Field layer grass and bare ground with occasional dogs' mercury and wood false brome	 In the northern part a plantation of ash with some oak, cherry, hornbeam, alder, and hawthorn

Photograph 5	Photograph 6
	
In the northern part field layer dominated by Brachodium sylvaticum with bramble	In the northern part very open canopy. Ash dieback present.

A.49 Theme_ID 1498717 AW

A.49.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Betula pendula	*O*	4
Salix sp	*R*	N/A
Crataegus monogyna	*F*	6
Acer pseudoplatanus	*F*	6
Carpinus betulus	*R*	6
Acer campestre	*O*	6
Fraxinus excelsior	*O*	6
Cornus sanguinea	*F*	6
Corylus avellana	*R*	6
Geum urbanum	*O*	7
Iris foetidissima	R	5
Geranium robertianum	*O*	6
Rubus fruticosus	*O*	6
Urtica dioica	*F*	8
Hedera helix	*R*	6
clematis vitalba	*R*	5
Veronica chamaedrys	*O*	5
Heracleum sphondylium	*O*	7
Quercus petraea	*O*	4
Tamus communis	*R*	6
Vicia sepium	*R*	6

Latin Name	DAFOR	Ellenberg value
Ribes rubrum	R	6
Epipactis helleborine	*R*	4
Euphorbia amygdaloides	*R*	6
Viola sp	*R*	N/A
Phyllitis scolopendrium	*R*	5
Dryopteris filix-mas	*R*	5
Angelica sylvestris	*O*	5
Fragaria vesca	*O*	4
Glechoma hederacea	*O*	7
Poa nemoralis	*R*	5
Galium aparine	*R*	8
Anacamptis pyramidalis	R	3
Viburnum opulus	R	6
Solanum dulcamara	R	7
Carex sylvatica	R	5
Circaea lutetiana	O	6
Rumex sanguineus	R	7
Poa trivialis	R	6

A.49.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	*7*	6
Acer campestre	*4*	6
Betula pendula	*1*	4
Fraxinus excelsior	*3*	6
Understorey		
Corylus avellana	*1*	6
Ilex aquifolium	*1*	5
Cornus sanguinea	*4*	6
Crataegus monogyna	*5*	6
Field layer		
Urtica dioica	*5*	8
Galium aparine	*3*	8
Heracleum sphondylium	2	7
Ajuga reptans	*4*	5
Geranium robertianum	*3*	6
Glechoma hederacea	*4*	7
Iris foetidissima	*1*	5
Rubus fruticosus	*3*	6
Hyacinthoides non-scripta	*4*	6
Hedera helix	*1*	6
Angelica sylvestris	*2*	5
Geum urbanum	*1*	7
Acer campestre	seedling	6

Acer pseudoplatanus	seedling	6

A.49.3 Condition assessment: Habitat parcel at 226_AW

Woodland criteria	Score	Comments
1	3	Three trees over 150 so higher score
2	2	Squirrel bark stripping
3	3	
4	3	
5	2	Significant sycamore
6	3	Open spaces are raised areas of dumped subsoil
7	3	
8	3	
9	3	
10	2	
11	1	
12	2	
13	1	
Total:	31 (Moderate)	

A.49.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Area of dense shading from sycamore canopy	 Clearing dominated by rosebay willowherb
Photograph 3	**Photograph 4**

Semi mature stands among area of bare ground

Photograph 5

Large rocky feature among woodland terrain

Photograph 6

Ground layer of woodland with nettle and bare ground

Photograph 7

More areas of open ground with tall ruderal dominant

Photograph 8

 Area of bare ground being colonised by tall ruderal. Possibly an area of dumped rubble from nearby house building.	 Areas of woodland heavily shaded by dense canopy
Photograph 9	
 Dense canopy creating shade on woodland floor	

A.50 Theme_ID1486883

A.50.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value

Canopy		
Acer campestre	F	6
Castanea sativa	O	5
Crataegus monogyna	F	6
Fraxinus excelsior	O	6
Understorey		
Betula pendula	R	4
Sambucus nigra	R	7
Corylus avellana	F	6
Field layer		
Torilis japonica	R	7
Mercurialis perennis	F	7
Hedera helix	A	6
Tamus communis	R	6
Brachypodium pinnatum	O	3
Urtica dioica	R	8
Rubus fruticosus	O	6
Hypericum perforatum	R	5
Hyacinthoides non-scripta	O	6
Rumex sanguineus	R	7
Primula vulgaris	R	4
Campanula trachelium	R	6
Epipactis helleborine	R	4
Ilex aquifolium	R	5
Lonicera periclymenum	R	5
clematis vitalba	R	5
Carpinus betulus	R	6
Wahlenbergia hederacea	R	3

A.50.2 Quadrat 1 (Q1)

Latin Name	**DOMIN**	**Ellenberg value**
Canopy		
Acer campestre	4	6
Crataegus monogyna	5	6
Corylus avellana	5	6
Fraxinus excelsior	4	6
Castanea sativa	2	5
Understorey		
Cornus sanguinea	2	6
Salix caprea	2	7
Field layer		
Hedera helix	8	6
Mercurialis perennis	4	7
Acer campestre	1	6
Rosa canina	2	6
Rubus fruticosus	2	6

Latin Name	DOMIN	Ellenberg value
Brachypodium pinnatum	2	3
Hyacinthoides non-scripta	3	6
Tamus communis	1	6

A.50.3 Condition assessment: Habitat parcel at 205_AW

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	3	
6	3	
7	1	
8	2	
9	3	
10	1	
11	1	
12	1	
13	3	
Total:	29 (Moderate)	

A.50.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Woodland edge bordering area of grassland	 Open grassland clearing
Photograph 3	**Photograph 4**

Shaded canopy with semi mature stands

Photograph 5

Photo one of ground layer dominated by ivy

Photograph 6

Photo two of ground layer dominated by ivy

Photograph 7

Shaded canopy with semi mature stands

Photograph 8

Fence running through the middle of woodland transect

Fence running through the middle of woodland transect

Photograph 9

Woodland edge bordering area of grassland

A.51 ThemeID 1498718_AW

A.51.1 Transect 1 (T1)

Latin Name	DAFOR	Ellenberg value
Canopy		

Latin Name	DAFOR	Ellenberg value
Quercus robur	O	4
Fagus sylvatica	O	5
Fraxinus excelsior	O	6
Castanea sativa	A	5
Carpinus betulus	R	6
Betula pendula	R	4
Acer pseudoplatanus	R	6
Understorey		
Taxus baccata	R	5
Acer campestre	O	6
Carpinus betulus	F	6
Crataegus laevigata	O	5
Cornus sanguinea	R	6
Sorbus aucuparia	R	4
Viburnumopulus	R	6
Field layer		
Geranium robertianum	O	6
Rubus fruticosus	F	6
Luzula pilosa	R	3
Epilobium sp.	R	N/A
Viola sp.	F	N/A
Fraxinus excelsior	O	6
Carex sylvatica	O	5
Arum maculatum	O	7
Cotoneaster sp.	R	N/A
Circaea lutetiana	O	6
Veronica montana	R	6
Monotropa hypopitys	R	2
Dryopteris dilatata	F	5
Rosa sp.	R	N/A
Polytrichum sp.	R	N/A
Hyacinthoides non-scripta	F	6
Mnium hornum	R	N/A
Anemone nemorosa	F	4
Lonicera periclymenum	R	5
Euphorbia amygdaloides	R	6
Geum urbanum	O	7
Mercurialis perennis	O	7
Sambucus nigra	R	7
Ilex aquifolium	R	5
Dryopteris filix-mas	R	5
Tamus communis	R	6
Primula vulgaris	R	4
Moehringia trinervia	R	6
Carex pendula	R	6

A.51.2 Quadrat 1 (Q1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	8	5
Quercus robur	4	4
Fagus sylvatica	4	5
Carpinus betulus	1	6
Understorey		
Taxus baccata	1	5
Carpinus betulus	5	6
Corylus avellana	4	6
Ilex aquifolium	1	5
Cornus sanguinea	1	6
Crataegus laevigata	1	5
Sorbus aucuparia	1	4
Field Layer		
Rubus fruticosus	4	6
Viola sp.	1	N/A
Anemone nemorosa	4	4
Veronica montana	2	6
Luzula pilosa	2	3
Carex sylvatica	1	5
Fraxinus excelsior	1	6
Lonicera periclymenum	1	5
Quercus robur	1	4
Leaf litter	9	N/A

A.51.3 Condition assessment: Habitat parcel at 221_AW

Woodland criteria	Score	Comments
1	3	
2	3	
3	3	
4	3	
5	1	
6	1	
7	2	
8	3	
9	3	
10	2	
11	2	
12	1	
13	2	
Total:	29 (Moderate)	

A.51.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Areas of sweet chestnut coppice among bare ground and remote sedge (AWI)	 Large mature hornbeam on a bare ground bank
Photograph 3	**Photograph 4**
 Yellow birds nest parasitising fungi that break down deadwood, indicative of a shaded forest floor	 Large mature oak tree in the canopy

Photograph 5	Photograph 6
 Badger signs among some dogs mercury	 Coppicing of silver birch trees within woodland
Photograph 7	**Photograph 8**
 Large mature beech in canopy	 Tree stump indicating tree felling is part of woodland management

Photograph 9	Photograph 10
 Ground layer with frequent bluebell	 Large areas of bare ground throughout woodland

A.52 Titsey Wood SSSI

A.52.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Fraxinus excelsior	A	6
Quercus robur	A	4
Understorey		
Acer campestre	F	6
Corylus avellana	F	6
Crataegus monogyna	F	6
Ilex aquifolium	R	5
Prunus spinosa	F	6
Salix cinerea	R	5
Ulex europaeus	R	3
Field layer		
Arrhenatherum elatius	R	7
Brachypodium sylvaticum	F	5
Bromopsis ramosa	R	7
Carex pendula	F	6
Carex sylvatica	F	5
Circaea lutetiana	F	6

Latin Name	DAFOR	Ellenberg value
Cirsium palustre	O	4
Deschampsia cespitosa	F	4
Dryopteris filix-mas	O	5
Festuca rubra	R	5
Fraxinus excelsior	F	6
Galium aparine	R	8
Geum urbanum	F	7
Glechoma hederacea	F	7
Holcus lanatus	F	5
Hyacinthoides non-scripta	F	6
Hypericum hirsutum	R	5
Impatiens parviflora	R	8
Lapsana communis	R	7
Lonicera periclymenum	O	5
Mercurialis perennis	F	7
Milium effusum	O	5
Myosotis sp.	O	N/A
Poa trivialis	F	6
Rosa arvensis	O	5
Rubus fruticosus	A	6
Rumex sanguineus	O	7
Scrophularia nodosa	F	6
Senecio jacobaea	R	4
Silene dioica	O	7
Sonchus oleraceus	R	7
Stellaria holostea	R	6
Tamus communis	O	6
Torilis japonica	O	7
Urtica dioica	O	8
Veronica chamaedrys	O	5
Veronica officinalis	R	4
Viola sp.	R	N/A

A.52.2 Quadrat 1

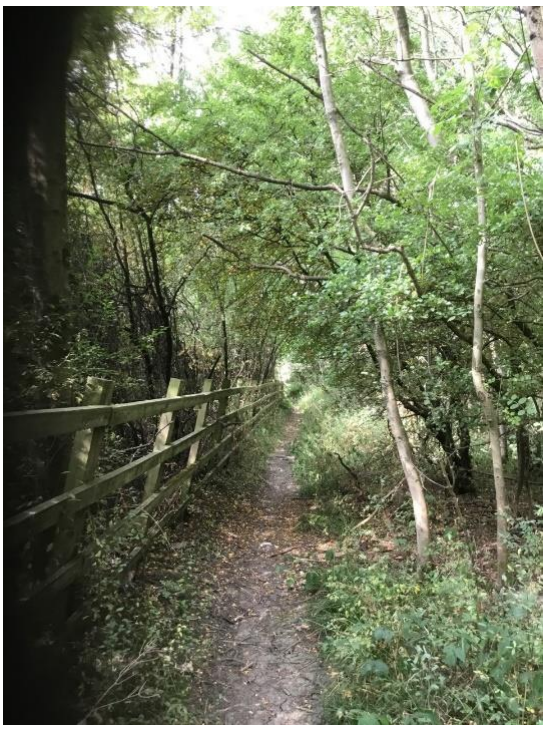
Latin Name	DOMIN	Ellenberg value
Canopy		
Quercus robur	7	4
Betula pendula	3	4
Fraxinus excelsior	7	6
Populus tremula	3	6
Understorey		
Acer campestre	3	6

Latin Name	DOMIN	Ellenberg value
Corylus avellana	4	6
Crataegus monogyna	4	6
Ilex aquifolium	1	5
Field layer		
Circaea lutetiana	2	6
Cirsium vulgare	1	6
Crataegus monogyna	1	6
Dryopteris filix-mas	1	5
Fraxinus excelsior	1	6
Geum urbanum	1	7
Glechoma hederacea	3	7
Holcus lanatus	4	5
Hyacinthoides non-scripta	3	6
Mercurialis perennis	4	7
Poa trivialis	4	6
Rosa arvensis	1	5
Rubus fruticosus	5	6
Senecio jacobaea	1	4

A.52.3 Condition assessment: Habitat parcel at 328_AW

Woodland criteria	Score	Comments
1	2	
2	2	
3	3	
4	3	
5	3	
6	3	
7	2	
8	1	Ash dieback
9	3	
10	2	
11	1	
12	3	
13	3	
Total:	31 (Moderate)	

A.52.4 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Canopy of ash and oak, understorey with frequent hazel, hawthorn, blackthorn, and field maple.	 Narrow road verge is largely planted with mainly a mixture of ash and field maple
Photograph 3	**Photograph 4**
 Narrow road verge is largely planted with mainly a mixture of ash and field maple	 Area fenced off for pheasant rearing

Photograph 5	Photograph 6
	
Ash dieback	Lots of rubbish found in roadside verge

A.53 Upper Brooms Wood AW_ThemeID1498405

A.53.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Carpinus betulus	F	6
Castanea sativa	D	5
Prunus avium	O	6
Quercus robur	F	4
Understorey		
Acer campestre	R	6
Betula pendula	O	4
Carpinus betulus	A	6
Corylus avellana	O	6
Crataegus laevigata	R	5
Crataegus monogyna	F	6
Fagus sylvatica	R	5
Ilex aquifolium	F	5
Prunus laurocerasus	O	6
Prunus spinosa	R	6
Sambucus nigra	R	7
Field layer		
Alliaria petiolata	R	8
Anthriscus sylvestris	R	7
Galium aparine	O	8
Geum urbanum	R	7

Hedera helix	O	6
Hyacinthoides non-scripta	F	6
Lonicera periclymenum	O	5
Melica uniflora	F	5
Poa trivialis	F	6
Pteridium aquilinum	O	3
Rosa arvensis	O	5
Rubus fruticosus	D	6
Tamus communis	R	6

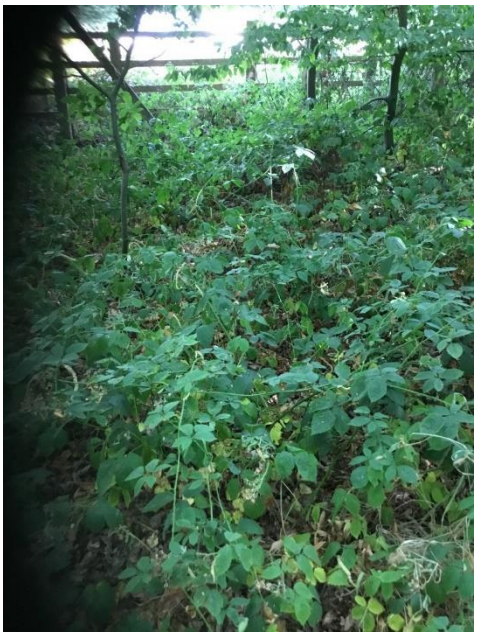
A.53.2 Quadrat 1 in Transect 1

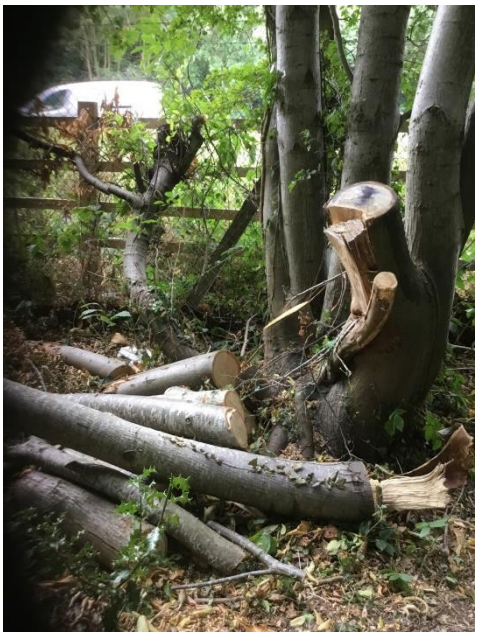
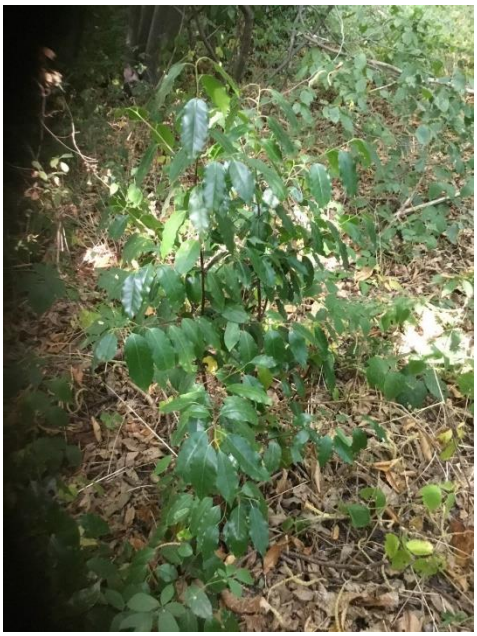
Latin Name	DOMIN	Ellenberg value
Canopy		
Castanea sativa	9	5
Betula pendula	2	4
Quercus robur	3	4
Carpinus betulus	3	6
Fraxinus excelsior	2	6
Understorey		
Ilex aquifolium	1	5
Crataegus monogyna	2	6
Castanea sativa	2	5
Carpinus betulus	4	6
Acer pseudoplatanus	1	6
Prunus laurocerasus	1	6
Field layer		
Rubus fruticosus	8	6
Ilex aquifolium	1	5
Poa trivialis	3	6
Dryopteris dilatata	1	5

A.53.3 Condition assessment: Habitat parcel at 346_AW

Woodland criteria	Score	Comments
1	2	
2	3	
3	2	
4	3	
5	1	
6	1	No open space
7	3	
8	3	Ash dieback present
9	2	
10	2	
11	1	
12	3	
13	2	Compacted ground, vandalised trees, and some fly tipping
Total:	28 (Moderate)	

A.53.4 Additional condition assessment notes: N/A

Photograph 1	Photograph 2
 canopy dominated by sweet chestnut with frequent oak and hornbeam	 Ground layer generally quite species poor dominated by bramble with frequent bluebell and rough meadow grass.
Photograph 3	**Photograph 4**
 Bark stripping present within the site	 Woodland being used to burn household waste

Photograph 5	Photograph 6
	
Sporadic felling of trees but appears to not be part of any woodland management programme	Cherry laurel present within the site

A.54 Westerham Wood AW ThemeID1499087

A.54.1 Transect 1

Latin Name	DAFOR	Ellenberg value
Betula pubescens	F	4
Fraxinus excelsior	A	6
Populus tremula	F	6
Prunus avium	R	6
Quercus robur	A	4
Acer campestre	R	6
Cornus sanguinea	R	6
Corylus avellana	A	6
Crataegus monogyna	O	6
Ilex aquifolium	O	5
Populus tremula	F	6
Prunus laurocerasus	R	6
Salix cinerea	R	5
Alliaria petiolata	O	8
Arrhenatherum elatius	O	7
Brachypodium sylvaticum	O	5
Bromopsis ramosa	R	7
Carex pendula	O	6
Carex remota	R	6

Latin Name	DAFOR	Ellenberg value
Carex sylvatica	O	5
Cirsium arvense	R	6
Cirsium vulgare	R	6
Clematis vitalba	R	5
Dactylis glomerata	O	6
Deschampsia cespitosa	F	4
Dryopteris filix-mas	O	5
Euphorbia amygdaloides	O	6
Geranium robertianum	R	6
Hedera helix	F	6
Hieracium sp.	R	
Holcus lanatus	O	5
Hyacinthoides non-scripta	F	6
Juncus conglomeratus	R	3
Juncus effusus	R	4
Juncus inflexus	R	5
Lapsana communis	R	7
Leucanthemum vulgare	R	4
Lonicera periclymenum	O	5
Mercurialis perennis	O	7
Milium effusum	R	5
Phleum pratense	R	6
Poa trivialis	F	6
Potentilla reptans	R	5
Potentilla sterilis	R	5
Primula vulgaris	R	4
Pulicaria dysenterica	R	4
Rosa arvensis	O	5
Rubus fruticosus	A	6
Rumex sanguineus	O	7
Senecio vulgaris	R	7
Stachys sylvatica	O	8
Tamus communis	R	6
Torilis japonica	O	7
Tussilago farfara	R	6
Urtica dioica	O	8
Veronica chamaedrys	R	5

A.54.2 Quadrat 1

Latin Name	DOMIN	Ellenberg value
Betula pubescens	4	4
Fraxinus excelsior	5	6
Populus tremula	4	6
Prunus avium	1	6

Quercus robur	7	4
Corylus avellana	5	6
Crataegus monogyna	2	6
Fagus sylvatica	1	5
Ilex aquifolium	3	5
Populus tremula	4	6
Sorbus aucuparia	1	4
Hyacinthoides non-scripta	4	6
Ilex aquifolium	1	5
Poa trivialis	4	6
Rosa arvensis	3	5
Rubus fruticosus	3	6

A.54.3 Condition assessment: Habitat parcel at 151_AW

Woodland criteria	Score	Comments
1	2	
2	2	
3	1	Large cherry laurel bushes present
4	3	
5	3	
6	1	
7	3	
8	2	
9	3	
10	3	
11	1	
12	2	
13	3	
Total:	29 (Moderate)	

A.54.4 Additional condition assessment notes: N/A

Photograph 1	Photograph 2

Hazel coppice present throughout the site

Aspen stands frequent with saplings and trees to 10m high

Photograph 3

Photograph 4

Severe ash dieback evident across the site

More mature oak and ash woodland with a canopy of abundant ash and oaks to 50 cm DBH north of the track

Photograph 5	Photograph 6
 Very dry field layer often consists of leaf litter and bare ground	 Field layer consists of bluebell, tufted hairgrass, bramble, nettle, & pendulous sedge.

A.55 Wouldham to Detling Escarpment SSSI

A.55.1 Habitat parcel 1 (Transect 1)

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	*F*	6
Betula pendula	*O*	4
Carpinus betulus	*R*	6
Fagus sylvatica	*R*	5
Fraxinus excelsior	*A*	6
Ilex aquifolium	*R*	5
Pinus sylvestris	R	2
Prunus padus	*R*	7
Taxus baccata	*R*	5
Ulmus glabra	*R*	6
Understorey		
Cornus sanguinea	*R*	6
Corylus avellana	*R*	6
Ligustrum vulgare	*F*	5
Viburnum lantana	*R*	5
Field layer		
Arum maculatum	*O*	7
Daphne laureola	*R*	5
Hedera helix	*A*	6
Mercurialis perennis	*F*	7
Tamus communis	*O*	6

Urtica dioica	*O*	8

A.55.2 Quadrat 1 along T1, Habitat parcel 1

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	*5*	6
Fraxinus excelsior	*7*	6
Understorey		
Corylus avellana	*2*	6
Ligustrum vulgare	*5*	5
Field layer		
Acer pseudoplatanus	*3*	6
Hedera helix	*8*	6
Ligustrum vulgare	*1*	5

A.55.3 Habitat parcel 1, Transect 2

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	*F*	6
Fraxinus excelsior	*O*	6
Ulmus sp.	*O*	N/A
Understorey		
Crataegus monogyna	*O*	6
Sambucus nigra	*F*	7
Field layer		
Ajuga reptans	*O*	5
Alliaria petiolata	*O*	8
Arum maculatum	R	7
Cornus sanguinea	*O*	6
Crataegus monogyna	*R*	6
Galium aparine	*R*	8
Glechoma hederacea	*O*	7
Mercurialis perennis	*O*	7
Urtica dioica	*F*	8

A.55.4 Quadrat 2, in T2 (Habitat parcel 1)

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	*8*	6
Fraxinus excelsior	*5*	6
Ulmus sp.	*3*	N/A
Understorey		
Buddleja davidii	*3*	5
Sambucus nigra	*6*	7
Field layer		

Latin Name	DOMIN	Ellenberg value
Acer pseudoplatanus	*6*	6
Arum maculatum	*1*	7
Myosotis sp.	*2*	N/A
Viola hirta	*1*	2
Bare ground	*7*	N/A

A.55.5 Transect 3 (Habitat parcel 2) grassland

Latin Name	DAFOR	Ellenberg value
Field layer		
Acer pseudoplatanus	*O*	6
Achillea millefolium	O	4
Anacamptis pyramidalis	R	3
Arrhenatherum elatius	R	7
Blackstonia perfoliata	R	2
Brachypodium pinnatum	F	3
Briza media	R	3
Bromopsis erecta	O	3
Carex flacca	F	2
Cirsium acaule	*O*	3
Cornus sanguinea	*O*	6
Crataegus monogyna	*O*	6
Cruciata laevipes	O	5
Euphrasia sp	O	N/A
Galium sterneri	*F*	1
Hypericum perforatum	F	5
Leontodon hispidus	O	3
Leucanthemum vulgare	*R*	4
Linum catharticum	*O*	2
Lotus corniculatus	F	2
Origanum vulgare	*F*	4
Phleum pratense	R	6
Pilosella officinarum	R	2
Poa trivialis	R	6
Polygala sp.	O	N/A
Potentilla reptans	F	5
Primula veris	*F*	3
Rosa sp.	R	N/A
Sanguisorba minor	*F*	3
Thymus polytrichus	O	2
Trifolium pratense	R	5
Trisetum flavescens	R	4
Viola sp.	O	N/A

A.55.6 Quadrat 3 (in Habitat parcel 2, transect 3) grassland

Latin Name	DOMIN	Ellenberg value
Field layer		
Acer pseudoplatanus	2	6
Bromopsis erecta	3	3
Carex flacca	7	2
Cirsium acaule	2	3
Crataegus monogyna	3	6
Cruciata laevipes	3	5
Euphrasia sp.	1	N/A
Galium mollugo	1	4
Hypericum perforatum	3	5
Leontodon hispidus	2	3
Linum catharticum	3	2
Lotus corniculatus	5	2
Origanum vulgare	4	4
Polygala sp.	1	N/A
Potentilla reptans	3	5
Primula veris	3	3
Pseudoscleropodium purum	4	N/A
Rosa sp.	1	N/A
Sanguisorba minor	5	3
Thymus polytrichus	3	2
Trifolium pratense	1	5
Trisetum flavescens	1	4
Viola sp.	3	N/A

A.55.7 Transect in Habitat parcel 3

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	R	6
Quercus cerris	F	6
Taxus baccata	O	5
Understorey		
Acer campestre	O	6
Cornus sanguinea	O	6
Corylus avellana	F	6
Crataegus monogyna	F	6
Prunus spinosa	O	6
Sambucus nigra	R	7
Viburnum lantana	R	5
Field layer		
Ajuga reptans	R	5
Alliaria petiolata	R	8
Anthriscus sylvestris	R	7
Arum maculatum	R	7
Brachypodium sylvaticum	R	5
Clematis vitalba	O	5
Cornus sanguinea	F	6
Epipactis helleborine	R	4
Fragaria vesca	R	4
Fraxinus excelsior	F	6

Latin Name	DAFOR	Ellenberg value
Galium aparine	R	8
Geranium robertianum	O	6
Geum urbanum	R	7
Hedera helix	F	6
Hyacinthoides non-scripta	R	6
Lapsana communis	R	7
Ligustrum vulgare	R	5
Poa trivialis	R	6
Rubus fruticosus	O	6
Rumex sanguinea	R	N/A
Solanum dulcamara	R	7
Stachys sylvatica	R	8
Urtica dioica	R	8
Viola hirta	R	2
Viola sp.	R	N/A
Bare ground	A	N/A

A.55.8 Quadrat in Habitat parcel 3

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Fraxinus excelsior	1	6
Quercus sp.	7	N/A
Understorey		
Corylus avellana	7	6
Crataegus monogyna	7	6
Sambucus nigra	3	7
Taxus baccata	4	5
Field layer		
Fraxinus excelsior	2	6
Cornus sanguinea	2	6
Leaf litter	10	N/A

A.55.9 Transect in Habitat parcel 4

Latin Name	DAFOR	Ellenberg value
Canopy		
Fagus sylvatica	F	5
Acer pseudoplatanus	F	6
Fagus sylvatica	F	5
Fraxinus excelsior	O	6
Taxus baccata	F	5
Understorey		
Corylus avellana	O	6
Ilex aquifolium	R	5
Taxus baccata	*O*	5
Field layer		
Hedera helix	LA	6
Prunus avium	O	6

Latin Name	DAFOR	Ellenberg value
Fraxinus excelsior	O	6
Leaf litter	A	N/A
Ligustrum vulgare	R	5

A.55.10 Quadrat in Habitat parcel 4

Latin Name	DOMIN	Ellenberg value
Canopy		A
Fagus sylvatica (purpurea)	1	N/A
Fagus sylvatica	7	5
Taxus baccata	7	5
Fraxinus excelsior	4	6
Acer pseudoplatanus	4	6
Understorey		
Corylus avellana	5	6
Crataegus monogyna	4	6
Ligustrum vulgare	2	5
Field layer		
Ilex aquifolium	1	5
Leaf litter	10	N/A
Fraxinus excelsior	1	6
Acer campestre	1	6

A.55.11 Transect in Habitat parcel 5

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	O	6
Fraxinus excelsior	R	6
Taxus baccata	F	5
Prunus avium	O	6
Acer campestre	R	6
Understorey		
Crataegus monogyna	R	6
Field layer		
Mercurialis perennis	R	7
Viola sp.	R	N/A
Urtica dioica	R	8
Fragaria vesca	R	4
Geum urbanum	R	7
Glechoma hederacea	R	7
Acer pseudoplatanus	O	6
Prunus avium	F	6

A.55.12 Quadrat in Habitat parcel 5

Latin Name	DOMIN	Ellenberg value
Canopy		
Acer pseudoplatanus	4	6
Fraxinus excelsior	4	6
Taxus baccata	4	5
Prunus avium	7	6
Understorey		
Crataegus monogyna	5	6
Acer campestre	2	6
Field layer		
Leaf litter	10	N/A
Hedera helix	2	6
Prunus avium	2	6
Acer pseudoplatanus	1	6

A.55.13 Transect in Habitat parcel 6

Latin Name	DAFOR	Ellenberg value
Canopy		
Acer pseudoplatanus	F	6
Carpinus betulus	F	6
Fraxinus excelsior	A	6
Quercus robur	A	4
Understorey		
Acer campestre	O	6
Clematis vitalba	O	5
Corylus avellana	F	6
Crataegus monogyna	O	6
Ilex aquifolium	O	5
Sambucus nigra	O	7
Taxus baccata	R	5
Field layer		
Alliaria petiolata	O	8
Arum maculatum	R	7
Calystegia sepium	O	7
Circaea lutetiana	O	6
Dryopteris dilatata	R	5
Dryopteris filix-mas	R	5
Geranium robertianum	O	6
Hedera helix	F	6
Heracleum sphondylium	R	7
Hyacinthoides non-scripta	F	6
Iris foetidissima	R	5
Mercurialis perennis	F	7
Prunus laurocerasus	R	6
Rubus fruticosus	F	6
Rumex sanguineus	O	7
Stachys sylvatica	O	8
Urtica dioica	F	8

A.55.14 No quadrat in Habitat parcel 6, as woodland not accessible.

A.55.15 Condition assessment: Transect 1 (woodland)

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	3	
6	3	
7	2	
8	3	
9	2	
10	3	
11	1	
12	3	
13	1	
Total:	32 (Moderate)	

A.55.16 Condition assessment: Transect 2 (woodland)

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	2	
5	1	
6	3	
7	1	
8	3	
9	2	Virtually no field layer and few ancient woodland indicators
10	2	
11	1	
12	2	
13	1	
Total:	26 (**Moderate)**	

A.55.17 Condition assessment: Transect 3 (grassland)

Grassland criteria	Score	Comments
1	Yes	
2	Yes	
3	No	
4	Yes	
5	Yes	
6	Yes	
Total:	Good	

A.55.18 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Maintained path through woodland	 Fallen mature tree creating large immovable deadwood
Photograph 3	**Photograph 4**
 Presence of nitrogen tolerant lichens	 Bare ground flora among relatively spare understory

A.56 Yaugher Woods AW and LWS

A.56.1 Habitat parcel 1

Latin Name	DAFOR	Ellenberg value
Canopy		
Betula pendula	F	4
Carpinus betulus	A	6
Castanea sativa	A	5
Fagus sylvatica	O	5
Fraxinus excelsior	A	6
Quercus robur	O	4
Understorey		
Acer campestre	O	6
Carpinus betulus	F	6
Cornus sanguinea	R	6
Corylus avellana	F	6
Crataegus monogyna	O	6
Cytisus scoparius	R	4
Ilex aquifolium	R	5
Prunus avium	R	6
Taxus baccata	R	5
Viburnum lantana	O	5
Field layer		
Brachypodium sylvaticum	A	5
Campanula glomerata	R	3
Carex sylvatica	O	5
Clematis vitalba	O	5
Geum urbanum	R	7
Hyacinthoides non-scripta	O	6
Lapsana communis	R	7
Mercurialis perennis	F_LA	7
Pteridium aquilinum	R	3
Rosa arvensis	R	5
Rubus fruticosus	F	6
Rumex sanguineus	O	7
Stachys sylvatica	R	8
Tamus communis	O	6
Urtica dioica	R	8
Viola sp.	O	N/A

A.56.2 Quadrat 1 in transect 1

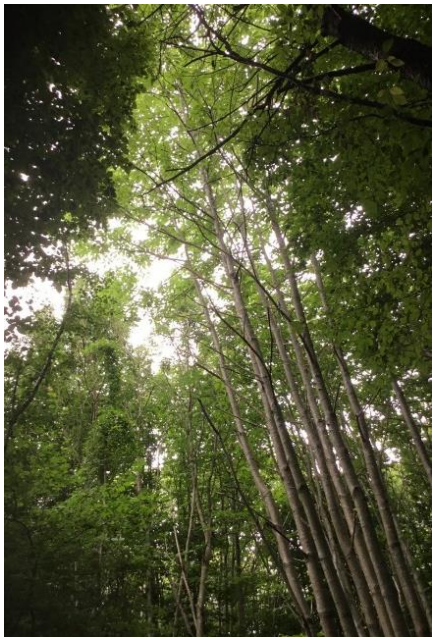
Latin Name	DOMIN	Ellenberg value
Quercus robur	2	4
Carpinus betulus	6	6
Prunus avium	1	6
Castanea sativa	6	5
Betula pendula	3	4
Fagus sylvatica	1	5
Acer campestre	2	6
Ilex aquifolium	1	5
Crataegus monogyna	2	6
Rosa arvensis	1	5
Cornus sanguinea	1	6
Cytisus scoparius	1	4
Corylus avellana	4	6
Viburnum lantana	1	5
Taxus baccata	1	5
Carex sylvatica	1	5
Mercurialis perennis	7	7
Rosa sp.	1	N/A
Rubus fruticosus	5	6
Viola sp.	1	N/A

A.56.3 Yaugher Woods AW and LWS (only Habitat parcel 1 surveyed in 2022)

A.56.4 Habitat parcel 1 condition assessment

Woodland criteria	Score	Comments
1	2	
2	3	
3	3	
4	3	
5	2	
6	1	No open space less than 10ha
7	2	
8	2	
9	2	
10	2	
11	1	
12	2	
13	3	
Total:	(28 moderate)	

A.56.5 Additional condition assessment notes: None

Photograph 1	Photograph 2
 Hornbeam, sweet chestnut and ash abundant in the canopy	 Woodland coppiced approximately 30 years ago, with regrowth from old stools
Photograph 3	**Photograph 4**
 The woodland is heavily shaded with a sparse field and ground layer	 Dense scrub present in the eastern side of the site

Legend

- Order Limits
- Construction Affected Road Network (ARN)
- Operational Affected Road Network (ARN)

Designated Sites

- Ancient Woodland (AW)
- Local Nature Reserve (LNR)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Nature Improvement Area (NIA)
- National Nature Reserve (NNR)
- Ramsar site
- Local Wildlife Site (LWS)/Site of Importance for Nature Conservation (SINC)/Site of Nature Conservation Interest (SNCI)
- Veteran Trees

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	13/10/2022	DCO Application	CD	LA	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status	DCO APPLICATION
Original Size	A3
Revision	P02
Application Document Number	TR010032/APP/6.3
Scale	1:310,000

Drawing Title: Figure 1 - Designated sites within 200m of ARN

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60090

Z:\Environment\Environmental Statement\08. Terrestrial Biodiversity\Nitrogen Deposition appendix plates\HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60090 - Fig.1 - Designated sites within 200m of ARN.aprx

If you need help accessing this or any other National Highways information, please call **0300 123 5000** and we will help you.

If you have any enquiries about this publication email **info@nationalhighways.co.uk**
or call **0300 123 5000***.

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.

These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

Printed on paper from well-managed forests and other controlled sources when issued directly by National Highways.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

National Highways Company Limited registered in England and Wales number 09346363