Stansted Airport 35+ Project (Ref: UTT/18/0460/FUL)

Habitats Regulations Assessment Appropriate Assessment

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PLACE SERVICES

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Essex County Council

Contents

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1.3	04.09.2018	Neil Harvey	Minor amendments for clarification
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0 Summary

0.1 Natural England advised Uttlesford District Council at pre-application stage that the Stansted 35+ application (either alone and/or in combination with other plans or projects) will have a likely significant effect on the internationally designated features of Epping Forest SAC and therefore will require assessment under the Habitats Regulations. Their letter of 10 May 2018 provided further details for this report which is an Appropriate Assessment.

0.2 This Appropriate Assessment is prepared by Place Services, on behalf of Uttlesford District Council, the Competent Authority under the Habitat Regulations in respect of this project. It is the intention of Uttlesford District Council to adopt this Appropriate Assessment.

0.3 Information to support a Habitats Regulations Assessment (RPS, May 2018) was prepared to accompany an application submitted by Stansted Airport Ltd (STAL) for the proposed expansion of airside infrastructure at Stansted Airport to make the best use of the existing runway as well as an associated increase in passenger numbers, known as the 35+ application.

0.4 The proposed development includes physical works associated with the 35+ application in terms of infrastructure development are limited to four locations:

- New Rapid Exit Taxiway (RET) to the south west of the existing runway;
- New Rapid Access Taxiway (RAT) to the north eastern end of the runway;
- Six new stands on the mid airfield (Yankee Remote Stands); and
- Three additional stands at the north eastern end of the airport (Echo Stands).

0.5 However Natural England advised that additional information needed to be provided by the applicant to enable the HRA to be carried out, including a detailed 'appropriate assessment' of disturbance effects on Epping Forest Special Area of Conservation (SAC). In accordance with advice from Natural England, RPS has provided information to support a Habitats Regulations Assessment which constitutes an update and expansion of the previous screening report presented in Appendix 16.1 of the Environmental Statement (Preliminary ecological appraisal). The RPS note incorporates the potential effects arising from aerial emissions from road traffic, based on the traffic modelling undertaken by Steer Davies Gleave (2017), on behalf of STAL, using the Highways Agency (now Highways England) Design Manual for Roads and Bridges (DMRB, 2007) methodology to identify roads that could have higher traffic as a result of the 35+ project.

0.6 The potential impact pathways have been reviewed having considered available baseline data (including newly available data in some cases) and the scientific evidence that is relevant to these pathways, and particularly to air pollution impacts.

0.7 The range of potential impacts on the SAC designated features have been identified and assessed and the likely impact is considered *de-minimus* from the development alone. However the impact from the development in combination with other plans and projects, without mitigation, could not rule out Likely

Significant Effect on Epping Forest SAC and therefore further assessment was needed. This report is therefore an Appropriate Assessment, considering in-combination effects, to enable Uttlesford District Council, the Local Planning Authority, to comply with Regulation 63 of The Conservation of Habitats and Species Regulations (2017).

0.8 The assessment considers the validity of predicted changes in vehicle numbers on roads adjacent to the SAC together with information about the practical impacts of emissions in relation to the distance of designated feature habitats from these roads and the current condition of the habitats in that area. The extent of predicted impacts is minimal and the proportion of the SAC designated features that could be affected is considered to be insignificant.

0.9 This Appropriate Assessment concludes that, this project for the proposed expansion of airside infrastructure at Stansted Airport to make the best use of the he existing runway as well as an associated increase in passenger numbers, known as the 35+ application, will have no adverse effect on the integrity of Epping Forest SAC as no failure of the conservation objectives is predicted, either alone or in combination. The development can therefore, subject to other considerations, be granted consent and Uttlesford DC can demonstrate its compliance with the UK Habitats Regulations 2017.

1 Introduction

1.1 The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) requires the Competent Authority, in this case Uttlesford District Council, to undertake a Habitat Regulations Assessment (HRA) before making a decision about permission for any plan or project that may result in a likely significant effect upon a Habitats (European) Site.

1.2 The detailed assessment of the development alone has been prepared by the applicants consultant RPS (RPS, July 2018), sections of which are reproduced here as part of the in-combination assessment.

1.3 The proposed development includes physical works associated with the 35+ application in terms of infrastructure development, limited to four locations:

- New Rapid Exit Taxiway (RET) to the south west of the existing runway;
- New Rapid Access Taxiway (RAT) to the north eastern end of the runway;
- Six new stands on the mid airfield (Yankee Remote Stands); and
- Three additional stands at the north eastern end of the airport (Echo Stands).

1.4 The proposed Airport development is not directly connected with, or necessary to, the management of a Habitats (European) site.[1] In addition to this, Natural England's view at pre-application stage was that the plan (either alone and/or in combination with other plans or projects) will have a likely significant effect on the internationally designated features of Epping Forest Special Area for Conservation (SAC) and therefore will require further assessment under the Habitats Regulations i.e. Step 2 Appropriate Assessment (Please refer to Box 2.3).

1.5 The ancient forest – wood pasture mosaic of Epping Forest SAC supports habitats that are sensitive to air quality (wet heathland, dry heathland, acid grassland, bogs, species-rich neutral grassland, wetlands, wood pasture and woodland communities including ancient and veteran trees, bryophytes, fungi and lichen) and these species are currently experiencing prolonged exceedances above air quality thresholds for NOx, ammonia and nitrogen deposition.

1.6 The proposed Airport development (alone and in combination) is likely to increase vehicle traffic flows in the surrounding area thus prolonging and possibly increasing these air quality exceedances with implications for habitat feature recovery and the SAC's ability to achieve favourable conservation status.

1.7 The assessment of impacts from development needs to take account of the risks of air pollution and how these can be managed and/or reduced. Further information on air pollution impacts and the sensitivity of different habitats or designated sites can be found on the Air Pollution Information System (www.apis.ac.uk) and additional information about modelling and assessment is available on the Environment Agency website.

1.8 The Air Quality Critical Levels and Critical Loads provide ranges for various habitat types. In most cases, for Epping Forest SAC, the lowest level should be taken as the appropriate precautionary threshold because of the environmental conditions (low rainfall), the ecological complexity and vulnerability of these

ancient Forest systems (ancient trees and soils with associated mycorrhizal communities, complex food webs and life cycles, transitional and mosaic habitats) and the variety of niches for epiphytic bryophytes and lichens. An additional consideration is the current condition of the feature and the environmental conditions it requires to achieve favourable conservation status. Discussions with Natural England have identified that Epping Forest SAC (a Habitats site) might be affected by the 35+ Project which should be screened for likely effects on designation features. The location of Epping Forest SAC in relation to Stansted airport is shown in Appendix 2.

1.9 In Natural England's letter of 8 November 2017, they advised that the proposed increase in annual passenger numbers, from 35 million passengers per annum (mppa) to 43 mppa is likely to result in increased road traffic movement to and from Stansted Airport. The Airport links to road and highway networks that currently take significant traffic flow adjacent to Epping Forest SAC, SSSI (*e.g.*, M11, M25 and linked A/B roads). The critical levels and loads of Nitrogen Oxides and Nitrogen deposition for this SSSI and SAC are currently being exceeded and it is recognised that additional road traffic associated with proposed growth and development may exacerbate this situation. Each new application therefore requires detailed assessment to ensure sustainable development solutions are achievable.

1.10 The Local Planning Authorities around Epping Forest SAC & SSSI are aware of this issue and are seeking to strategically address it through their Local Plans, principally by ensuring compliance with SEA and HRA requirements. The MoUs for the West Essex/Hertfordshire Housing Market Area (HMA) and Highways & Transport Infrastructure include Epping Forest District Council, Harlow District Council, East Herts District Council, and Uttlesford District Council as well as Essex County Council Highways, Hertfordshire County Council and Highways England. **It should be noted that the HRAs for the MoUs Local Plans only currently consider traffic modelling for a scenario with 35mppa at Stansted Airport. Furthermore, Natural England has previously advised these MoU authorities, in discussions regarding their local plans, that they cannot discount a likely significant effect in combination with other plans or projects at this stage and that an appropriate assessment is therefore necessary for the HMA authorities Local Plans.**

1.11 For the reasons set out above and in more detail in their letter dated 10 May 2018, Natural England cannot discount that the proposed development will have a likely significant effect on the internationally designated features of Epping Forest SAC, alone and/or in combination with other plans and projects. Consequently the proposed Stansted Airport 35+ development requires an Appropriate Assessment under the Habitats Regulations and Natural England's advice about the adequacy and conclusion of the submitted document ref: 'Information to Inform a Habitats Regulation Assessment (HRA) June 2018' is provided below.

1.12 In accordance with advice from Natural England, RPS provided information to support a Habitats Regulations Assessment which constitutes an update and expansion of the previous screening report presented in Appendix 16.1 of the Environmental Statement (Preliminary ecological appraisal). The RPS note incorporates the potential effects arising from aerial emissions from road traffic, based on the traffic modelling undertaken by Steer Davies Gleave (2017), on behalf of STAL, using the Highways Agency (now Highways England) Design Manual for Roads and Bridges (DMRB, 2007) methodology to identify roads that could have higher traffic as a result of the Stansted 35+ project.

1.13 A screening approach is advocated in the DMRB and potentially affected roads are those that meet any of the following criteria:

- Road alignment will change by 5m or more; or
- Daily traffic flows will change by 1,000 AADT or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10km/hr or more; or
- Peak hour speed will change by 20km/hr or more.

1.14 In this instance, all roads can be screened out of this Appropriate Assessment as not significant, with the exception of the M25 (J26- J27). Please refer to Section 4.9 where the assessment of this criterion can be found.

1.15 Only properties and Designated Sites within 200m of roads affected by the project need be considered.

1.16 Shape files for these sites, were obtained by RPS from Natural England's publicly-available download resource (hosted by data.gov.uk). These were plotted along with all roads meeting one of the above criteria; along with a 200m buffer marked on, as required by the DMRB methodology.

1.17 This Appropriate Assessment is prepared by Place Services, on behalf of Uttlesford District Council, the Competent Authority under the Habitat Regulations in respect of this project. It is the intention of Uttlesford District Council to adopt this Appropriate Assessment.

2 Basis of the Assessment

2.1 This AA Report seeks to ascertain whether or not this proposal (either alone or in combination with other proposals) would be likely to have an adverse effect on the integrity of Epping Forest SAC.

2.2 The legal basis for the Habitats Regulations Assessment process stems from The Habitats Directive (Box 2.2).

Box 2.2. Habitats Sites: SACs, SPAs and Ramsar sites

The Habitats Directive passed into UK domestic law by way of the Conservation (Natural Habitats, &c.) Regulations 1994 ('The Habitat Regulations'). These are now superseded by the Conservation of Habitats and Species Regulations 2017.

The Conservation of Offshore Marine Habitats and Species Regulations (2007) have also been superseded by the Conservation of Offshore Marine Habitats and Species Regulations (2017)

'Natura 2000' is the name given to the European Union-wide network of nature conservation sites designated under two EU Directives: **Council Directive 79/409/EEC on the Conservation of Wild Birds** ('The Birds Directive') and **Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora** ('The Habitats Directive'). The former sites are classified as SPAs and the latter as SACs. The sites thus designated under these Directives include most Ramsar sites in England and they are, therefore, part of the Natura 2000 network.

The Ramsar List of Wetlands of International Importance is a result of an inter-governmental treaty '**The Convention on Wetlands of International Importance especially as Waterfowl Habitat**' which was signed in the town of Ramsar, Iraq, in 1971 ('The Ramsar Convention'). It was ratified into UK Law in 1976 and the UK Government is fully committed to implementation of the Convention.

All Ramsar sites in England are **Sites of Special Scientific Interest** (SSSIs). All **Special Protection Areas** (SPAs) and **Special Areas of Conservation** (SACs) are constituted from component SSSIs.

2.3 The need for an AA is set out within Article 6 of The Habitats Directive (1992), and interpreted into UK Law by Regulation 63 of the Habitats Regulations. The ultimate aim of HRA is to 'maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest' (The Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the Habitats sites themselves, although the sites have a significant role in delivering favourable conservation status.

Box 2.3 Main steps in Habitats Regulations Assessment

1. Screening: identifies the likely impacts on a Habitats site of a project or plan, either alone or in combination with other projects and plans, and considers whether these impacts are likely to be significant;
2. Appropriate Assessment: considers the impact on integrity of the Habitats sites of the project or plan, either alone or in combination with other projects and plans with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, it assesses the potential mitigation of those impacts;

3.	Assessment of alternative solutions: examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Habitats site;
4.	Assessment where no alternative solutions exist and where adverse impacts remain: assesses compensatory measures where, in the light of an assessment of imperative reasons of over-riding public interest, it is deemed that the project or plan should proceed.

2.4 The likelihood of a significant effect on the designation features of Epping Forest SAC from air quality was originally excluded from the submitted Environmental Statement following the scoping report and opinion from the competent authorities. However the EIA submission provided information on which Natural England advised Uttlesford DC that it could not rule out Likely Significant Effect and therefore in order to ascertain whether or not site integrity will be affected, an AA report needed to be undertaken (Box 2.3 step 2).

3 Habitats (Natura 2000/European) Sites

3.1 The Favourable Conservation tables for Epping Forest SAC are detailed in Appendix 3. The potential effects of the proposed expansion of airside infrastructure at Stansted Airport to make the best use of the existing runway on the SAC Interest Features, with an associated increase in passenger numbers, have been described with a significance level, to inform a view as to whether or not the project is likely to result in adverse impacts on the integrity of the Epping Forest SAC. Special Areas of Conservation (SACs) are strictly protected sites designated under the European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (known as the Habitats Directive). Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended).

3.2 A sub-set of the Annex I habitat types are defined as being 'priority' because they are considered to be particularly vulnerable and are mainly, or exclusively, found within the European Union (Article 1d). The importance of these 'priority habitat' types is emphasised at several places in the Directive (Articles 4 and 5 and Annex III), not only in terms of the selection of sites, but also in the measures required for site protection (Article 6) and surveillance (Article 11).

3.3 The Epping Forest SAC stretches from Leytonstone to Epping, covering an area of 1,604.95 ha.

3.4 The citation for the site provides the following description of the SAC:

"Epping Forest is a large ancient wood-pasture with habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains, wet and dry heathland and scattered wetland. The semi-natural woodland is particularly extensive but the Forest plains are also a major feature and contain a variety of unimproved acid grasslands.

The semi-natural woodlands of Epping Forest include important beech Fagus sylvatica forests on acid soils, which are important for a range of rare epiphytic species, including the moss Zygodon forsteri. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and invertebrates associated with decaying timber. Records of stag beetle Lucanus cervus are widespread and frequent.

Areas of acidic grassland transitional with heathland are generally dominated by a mixture of fine- leaved grasses. In marshier areas, purple moor-grass Molinia caerulea frequently becomes dominant. Broad-leaved herbs typical of acidic grassland and heathland are frequent, including heather Calluna vulgaris. The site also contains an example of wet dwarf-shrub heath with both heather and cross-leaved heath Erica tetralix."

3.5 Qualifying features include a range of both habitats and species. Habitats include:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*). (Beech forests on acid soils);

- European dry heaths;

- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath);

3.6 The site is also designated for qualifying species, which include:

- Stag beetle *Lucanus cervus.*

3.7 The Conservation Objectives for a designated site set out the goals that are considered necessary to maintain or restore the qualifying features of a site to Favourable Conservation Status. Subject to natural change, the Conservation Objectives for the Epping Forest, are to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- The populations of qualifying species; and,
- The distribution of qualifying species within the site.

Site Improvement Plan – Epping Forest SAC (14/12/2016)

3.8 The Site Improvement Plan (SIP) provides a high-level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site and outlines the priority measures required to improve the condition of the features.

3.9 The current priority issues for the site are:

- Air pollution (Impact of atmospheric nitrogen deposition);
- Under grazing;
- Public access/disturbance;
- Changes in species distributions;
- Inappropriate water levels;
- Water pollution;
- Invasive species; and
- Disease.

3.10 There are several proposed actions to address the above priority issues.

4 Consideration of the Development

4.1 The Favourable Conservation tables for Epping Forest SAC are detailed in Appendix 3. The potential effects of the proposed expansion of airside infrastructure at Stansted Airport to make the best use of the existing runway on the SAC Interest Features, with an associated increase in passenger numbers, have been described with a significance level, to inform a view as to whether or not the project is likely to result in adverse impacts on the integrity of the Epping Forest SAC.

4.2 Assessing the predicted effects of the scheme in relation to the designated features enables the potential effect on favourable condition and hence on the designated status of Epping Forest SAC to be determined. This in turn informs subsequent consideration of whether or not an adverse effect on integrity (AEOI) of Epping Forest SAC is predicted.

4.3 In order to satisfy the requirements of the Habitats Regulations for this proposal at this AA stage, Uttlesford District Council will need to consider the impacts arising from the development and provide evidence to demonstrate that any proposed mitigation measures will be able to fully mitigate for these impacts.

4.4 The EIA Report (Chapter 10) provided further information on air quality and Natural England advice (9th July 2018) stated that significant effects on the qualifying habitats of Epping Forest SAC are likely. The information on SAC features was supplied by the applicant in the form of a matrix as shown in Table 4.8. However unlike the applicant's submitted matrix, where the symbol 'x' appears, we have represented this as an application of the AEOI test and where AEOI can be avoided.

Potential impacts of Stansted 35+ on Epping Forest SAC Features "Alone"

4.5 In order to ensure a robust assessment, all potential direct, indirect or secondary impacts of the scheme (either alone or in combination with other plans or projects) on the relevant European Sites, in the context of their conservation objectives, have been considered. These are summarised below in Table 4.6.

4.6 Note that decommissioning is not included in the screening as effects, since there is no intended date or plan for decommissioning.

Table 4.6: Scheme activities, impact pathways and potential effects from the Stansted 35+ Project.

Scheme Activities	Impact Pathway to a SAC Interest Feature	Potential Effect
Construction		
Land take	Direct habitat loss for construction (SAC species feature)	Loss of habitat for SAC species feature Reduced numbers of SAC species features

	Direct habitat loss for construction (SAC habitat feature)	Reduction of extent of SAC habitat feature
	Habitat fragmentation	Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features
Aerial emissions	Increase in atmospheric deposition and atmospheric concentrations of pollutants from construction traffic	Damage to SAC habitat features
Discharge of pollutants to water during construction	Deterioration in water quality	Damage to SAC habitat features Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features
Noise and vibration generated during construction	Disturbance to species	Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features
Light spill during construction	Disturbance to species	Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features
Operation		
Aerial emissions	Increase in atmospheric deposition and atmospheric concentrations of pollutants	Damage to SAC habitat features
Aqueous emissions	Increase in aquatic concentrations of pollutants Increase in water temperature (thermal effects) Alteration to hydrological characteristics of fluvial habitats	Damage to SAC habitat features

	Increase in aquatic concentrations of pollutants Increase in water temperature (thermal effects)	Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features
Noise generated during operation	Disturbance to species	Reduced foraging opportunity for SAC species features Reduced breeding opportunity for SAC species features Reduced dispersal opportunity for SAC species features

4.1 The screening matrices for the Stansted 35+ Project are provided below. The purpose of the matrices is to provide the decision maker with a succinct summary of potential effects.

4.2 Matrix Key:

✓ = AEOI cannot be avoided without consideration of mitigation
✕ = AEOI can be avoided
C = construction
O = operation

Distance to Proposal site	23.1 km													
Epping Forest SAC **European site features**	Land take		Habitat fragmentation		Aerial emission – Surface access		Aerial emissions – Airport operations		Aqueous emissions / discharges		Noise & Vibration		Lighting	
	C	*O*	*C*	*O*	*C*	*O*	*C*	*O*	*C*	*O*	*C*	*O*	*C*	*O*
9120 Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)	✕a	✕a	✕b	✕b	✕c	✕d	✕e	✕e	✕f	✕f	✕g	✕g	✕h	✕h
4010 Northern Atlantic wet heaths with *Erica tetralix*	✕a	✕a	✕b	✕b	✕c	✕d	✕e	✕e	✕f	✕f	✕g	✕g	✕h	✕h
4030 European dry heaths	✕a	✕a	✕b	✕b	✕c	✕d	✕e	✕e	✕f	✕f	✕g	✕g	✕h	✕h
1083 Stag beetle *Lucanus cervus*	✕a	✕a	✕b	✕b	✕c	✕d	✕e	✕e	✕f	✕f	✕g	✕g	✕h	✕h

Evidence supporting conclusions

a.	Nearest element of the Stansted 35+ project is 23.1 km from site; no potential for direct habitat
b.	Nearest element of the Stansted 35+ project is 23.1 km from site; no potential for fragmentation to affect habitats.
c.	Site 23.1 km from scheme; no potential for aerial emissions during construction work on site to affect habitats within SAC. Any generators *etc*. would be small scale and therefore, the potential zone of influence would be considerably smaller than this.
d.	Steer Davies Gleave traffic assessment has noted that the Stansted 35+ project will result in an increase of 1,493 vehicular movements per day on J26-J27 of the M25 which is within 200 m of Epping Forest SAC. This represents an increase in AADT on this stretch of the M25 of 0.88% and is therefore considered to be insignificant (i.e. <1%) in traffic flow terms. Further justification for this conclusion is provided below. The highest change in AADT as a result of the Stansted 35+ project on the local roads passing through Epping Forest was 12 on the northern section of the B1353 Epping Road. On the basis of such a low change in AADT, traffic resulting from the 35+ project on these roads can reasonably be considered *de minimis* and therefore no further assessment of emissions from these local roads alone is necessary.
e.	Nearest element of the Stansted 35+ project is 23.1 km from site; no potential for effects from aerial emissions/discharges.
f.	Nearest element of the Stansted 35+ project is 23.1 km from site; no potential for effects from aqueous emissions/discharges.
g.	Nearest element of the Stansted 35+ project is 23.1 km from site; no potential for noise / vibration effects on species populations within SAC.
h.	Nearest element of the Stansted 35+ project is 23.1 km from site; therefore, no potential for lighting effects on species/habitats within SAC.

4.9. The main trip analysis reported in Chapter 6 of the ES (Surface Access) was prepared on a simple "no-alternative trip scenario", i.e. on the assumption that all additional traffic associated with the increased passenger movements at Stansted Airport would not otherwise arise. On this basis, in all scenarios/assessment years the only potentially relevant road (with >1000 AADT traffic increase) would be the M25 (J26-27) adjacent to Epping Forest SAC. This is also the only road with increases in traffic above a de minimis level within 200 metres of the Habitats Site. Local roads within and directly adjoining the SAC were modelled and the largest increase is 12 AADT on the northern section of the B1353 Epping Road, which is considered de minimis. Therefore, even with a very robust assumption of "no alternative trips" for the new passengers, all roads but the M25 (J26-J27) can be screened out as not likely to result in AEOI of Epping Forest SAC.

4.3 The assessment of the change in traffic flows on the M25 as a result of Stansted 35+ Project in the "no alternative trip scenario" is predicted to attract an additional 1,493 vehicular movements per day on the M25 (J26-27) link as a result of passenger- and employee-related travel compared to the current predicted Do Minimum scenario for the assessment year (2028).

4.4 *Potential impacts compared to the predicted Do Minimum scenario*

4.5 As noted above, the base assumption reported in Chapter 6 of the ES does not take in to account the fact that in the absence of expansion of operations at Stansted, given the DfT predicted increase in demand for air travel, the 8 million additional passenger trips that would be attracted to Stansted would otherwise be attracted to other UK airports (such as Bristol, Birmingham and East Midlands). Appendix H of the STAL

35+ Transport Assessment (ES Volume 3) examines a more holistic approach and looks at the alternative routing of the additional car based trips to other airports in the without development (Do Minimum) scenario.

4.6 The assessment contained in Appendix H (re-presented here as Appendix 1) concluded that the likely net effect of the airport expansion *i.e.* comparing the Development Case (termed the 'Do Something Case' in the TA) with the Do Minimum scenario, is neutral or results in small reduction of trips on the relevant section of the M25 in these alternative scenarios. The London market demand will be constrained from 2022/3 when the available capacities of the main London airports (Heathrow, Gatwick and Stansted) become extremely limited; each airport being effectively 'full' at that time. These airports would therefore not be able to accommodate the 8mppa passenger demand predicted by STAL's expert forecasters ICF. However, it is expected that demand for air travel will remain unabated and that alternative airports further afield will attract these trips.

4.7 Results from the redistribution analysis (described in Appendix 4) for Birmingham Airport, East Midlands Airport and Bristol Airport all indicate between 1% and 12% more airport-derived vehicular trips will use the M25 (J26-27) link if the Stansted 35+ Project does not go ahead. These additional trips correspond proportionally to the additional passenger demand (8mppa), which would then redistribute to these alternative airports because Stansted would not be able to accommodate them. Of course, in practice, the alternative passenger trips could be anticipated to be shared amongst these and other smaller airports but the effect of traffic flows would be very similar.

4.8 The results of the detailed passenger displacement analysis show that the Stansted 35+ Project (Development Case) will actually have less impact on the total traffic flows for the M25 (J26-27) link closest to Epping Forest SAC, being 0.93% growth in vehicular traffic. This is compared to the displacement of passengers to alternative UK Airports in the without development (Do Minimum) case, which amounts to 0.94% and 1.04% growth in vehicular traffic.

4.9 Furthermore, it should be noted that the uplift in passengers is in comparison to the combined passenger and employee vehicle trips associated with the Stansted 35+ Development Case. It is therefore reasonable to assume that some potential employees would also be displaced to these other airports if the Stansted 35+ Project did not proceed, although this effect cannot be readily quantified. This would further increase the traffic growth on the M25 (J26-27) link in the without development (Do Minimum) case.

4.10 In summary, when comparing the Development Case and Do Minimum scenario, rather than there being a net increase of 1,493 AADT by 2028 (as reported in the main TA analysis), the more likely outcome would be a net reduction of between -15 and -184 AADT on the M25 (J26-27), depending on where the passengers redirect to as a result of the Stansted 35+ Project not going ahead. The basis of this hypothesis has been agreed in principle by Highways England.

4.11 In light of the above, the Stansted 35+ Project is considered unlikely to give rise to AOEI of Epping Forest SAC due to changes in air quality from traffic generation, and will instead provide a net reduction in traffic on the key section of the M25 closest to the Epping Forest SAC when compared to the traffic flows which would be generated without the development.

4.12 *Potential impacts of the Development Case (Do-Something scenario)*

4.13 Notwithstanding the assessment above, which reveals that by 2028 the Stansted 35+ Project will give rise to a lesser traffic increase than under the without development scenario, Natural England has previously

indicated it has concerns about the absolute ('worst case') addition of 1,493 vehicular movements per day on the M25 (J26-27) link as a result of passenger and employee-related travel. This is an increase of <1% in the AADT on the M25 and is not considered significant in traffic terms on that basis. Nevertheless, an assessment of the potential for AEOI of Epping Forest SAC from the traffic associated with this scenario is included in this report for clarity and completeness.

4.14 At the point at which it passes closest to the Epping Forest SAC, the M25 is underground within the Bell Common Tunnel with the eastern portal approximately 120 m east of the SAC boundary and the western portal approximately 15 m from the boundary. However, as the M25 is in a tree- lined cutting at this point, there is also significant vertical distance (circa 10 m) between the carriageway level and the SAC.

4.15 Current guidelines on the assessment of effects of increases in road traffic (HA 2007) require the consideration of designated sites within 200 m of the centre line of carriageways. The basis for this is the widely-observed trend in concentration of NOx (and associated nutrient nitrogen deposition) to decrease in a logarithmic manner down to background by this distance, although some studies have shown small increases at distances greater than this. However, all studies have shown the greatest decrease in NOx concentration within 100 m of the road (see Natural England 2016b and references therein).

4.16 For example, transect studies have shown that impacts are greatest within the first 50-100 m from roads, however. For example, Bignal et al. (2008) found that at Bradley Wood more than 60% of oak trees adjacent to the road had severely defoliated and discoloured crowns, but by 150 m from the road, no trees were severely defoliated. At Aston Rowant, the same authors found there was little difference in beech tree health between 50–200 m from a motorway except for leaf discolouration, which affected more than 30% of trees up to 100 m from the road.

4.17 This trend is supported by a study of local air quality monitoring at Epping Forest (Gadsdon & Power, 2009) which found NO2 and NH3 derived from traffic emissions on local roads within the SAC made a substantial contribution to the exceedance of critical levels and critical loads at roadside locations and up to 20 m from the edge of the carriageway. Although concentrations were above background for up to 250 m, the decrease in concentration in the initial 20-50 m from the road edge was most substantial; from 50 m, the decrease in NOx concentration beyond 50m was very shallow. Data presented in that paper (Figure 1 (a)) shows the relationship between the distance from the road edge (x) and NOx concentration (y) can be expressed by the equation y = - 2.859ln(x) + 38.176. Therefore, the measured distance at which the NOx concentration dropped below the critical level of 30 µg.m-3 in that study, was 17.46 m from the roadside.

4.18 While elevated NOx concentrations and associated nutrient nitrogen deposition have been noted at distances greater than 200 m (such as that observed in Gadsdon & Power, 2009), the ecological effect of such increases beyond this distance have not been identified with many studies showing no change in the particular indicator of ecological function such as Ellenburg Value or habitat species richness, despite slightly elevated pollutant levels (when compared to background). For example, a 520 m transect into Norway spruce woodland in Germany (Bernhardt-Römermann *et al. 2006)* away from motorways suggested that impacts on the composition of the field layer extended for up to 80 m upwind of the motorways (Epping Forest is upwind of the M25).

4.19 Also, a similar transect study of blanket bog at Moss Moor (part of the South Pennine Moors SAC) adjacent to the M62 (Bignal et al., 2007) used Ellenburg Values to show that species adapted to higher nitrogen availability had greater ground cover up to around 75 m from the motorway (consistent with the measured profile of NO2), and declined to background levels at around 100 m.

4.20 Air quality modelling of the increase in NOx concentration and associated nutrient nitrogen deposition from the Do-Something scenario has been undertaken, based on the modelled traffic increase described above (Appendix 4).

4.21 The maximum predicted change in NOx concentration at the edge of the SAC as a result of the additional traffic from the Stansted 35+ project is 0.0931 µg.m-3, well below either 1% of the critical level set for the protection of vegetation (30 µg.m-3) or the 0.4 µg.m-3 set within the DMRB. The associated change in nutrient nitrogen deposition is 0.0188 kgN.ha-1.yr-1, also well below 1% of the lower critical load for the Annex I woodland (10 kgN.ha-1.yr-1, taken from the Site-Relevant Critical Load Tool on the government's Air Pollution Information System (APIS), www.apis.ac.uk). Data presented in Appendix 4 also show that the contribution from the Stansted 35+ project decreases rapidly with distance from the M25, supporting the findings of previous work described above.

4.22 Such small increases in both NOx concentration and nutrient nitrogen deposition rates are both below existing thresholds requiring further assessment (as set out in HA 2007 or Environment Agency 2012a & 2012b) and as such no AEOI would be predicted. These thresholds are considered to be de minimis (i.e. so small as to be inconsequential) and therefore no AEOI either alone or in combination with other plans/projects. The rationale behind the use of 1% is described in AQTAG21 (2015); essentially, it is set at a point that is three orders of magnitude below the EQS and is therefore sufficiently precautionary to minimise the risk of screening out potential impacts when the situation would otherwise merit further investigation.

4.23 To further support this conclusion, RPS undertook vegetation surveys of the northern section (in May 2018) of the Epping Forest SAC in the vicinity of the nearest section of the M25 motorway to the designated site, namely Unit 105 (Appendix 2), with a particular focus on the habitat within 200m of the tunnel portals, this distance being informed by DMRB methodology and available research. The aim of the survey was to determine the SAC habitats present (and specifically the features of interest for which the site is designated) within this unit, particularly within 200 m of the M25 and therefore the potential for AEOI of Epping Forest SAC. The locations of the veteran trees (as the main host of potentially vulnerable epiphytes) were mapped and notes made on whether these displayed evidence of stress that could be associated with air pollution. A further aim was to determine the SAC habitats present in relation to dominance by nitrophilous species (*e.g.* nettles, brambles etc.) that may result from eutrophication from nitrogen deposition from NOx.

4.24 The most recent condition assessment of the underlying Site of Special Scientific Interest (SSSI) noted that the unit in this location (Unit 105) was in Favourable condition, however:

4.25 "… notwithstanding this assessment, there remains a very significant issue relating to air quality and the related deposition of acidity and of nitrogen. Many veteran trees within the unit display clear symptoms of stress (*e.g.* thin canopy and die-back of leading shoots), there is excessive growth of bramble, and there are dense stands of nettles along roadsides and ride edges."

4.26 The only habitat present within 200 m of the M25 in Unit 105 is the woodland Annex I habitat Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus i*n the shrub layer (Quercion robori-petraeae or Ilici-Fagenion) – no dry or wet heath habitats were present.

4.27 No veteran trees occur within 200 m of the Bell Common Tunnel eastern portal, nor within 100 m of the western portal. As described in the recent condition assessment, there was evidence of poor condition of oak trees (in the form of tip die back and significant epicormic growth) at the north of the survey area

although there did not appear to be any link with distance from road and it is not possible from the observational evidence alone to attribute the cause of such symptoms.

4.28 Epiphyte number and diversity were low across the entire study area with no clear trend relating to the roads and it is understood that the main area of epiphyte interest within the SAC is the core central zone well to the south of Unit 105 (pers. comm. J. Dagley CoLC). The number of veteran trees in the study area was also small (eight within 200 m of the M25). This is within the context of Epping Forest as a whole which supports over 50,000 veteran trees (CoLC 2017) – *i.e.* <0.016% of the total resource. A full survey of the veteran tree resource within the SAC is currently underway by CoLC. Indications are that the total number of veteran trees is likely to be closer to 55,000 which would reduce this percentage further.

4.29 Areas of dense bramble and nettle occurred in areas dominated by oak outside and along the boundary of the SAC, but were absent from the beech-dominated woodland.

4.30 On the basis of the survey, the area of the SAC within buffer zones around the M25 were calculated (Figure 2 and Table 4.34). The total area of the SAC within 200 m of the M25 is 5.53 ha, 0.34% of the total area of the SAC and 0.85% of the 652.3 ha of Annex I beech woodland that occurs within the Forest (data taken from the Natura 2000 Standard Data Form for Epping Forest – Appendix 3). Therefore, the total area of woodland within 200 m of the M25 is so small as to be *de minimis* within the context of the SAC as a whole and therefore not undermine the site's Conservation Objectives.

Table 4.34: Areas of the Epping Forest SAC within 200 m of the M25 portals

Distance from tunnel portal of M25	Area of SAC within buffer	% of total area of SAC	Number of veteran within buffer
20m buffer	0.01ha	0.0006%	0
50m buffer	0.19ha	0.01%	0
100m buffer	0.99ha	0.06%	0
150 m buffer	2.65ha	0.17%	3
200m buffer	5.53ha	0.34%	8
Total area of SAC 1,604.95 ha			

4.31 Therefore, on the basis that:

- the increase in AADT on the M25 associated with the Stansted 35+ project is <1% of the total traffic flow;
- associated maximum modelled increases in NOx concentration and nutrient nitrogen deposition at the edge of the SAC are <1% of the relevant thresholds and decrease very rapidly with distance;
- the overall condition of Unit 105 is described as being in favourable condition, despite the high background nutrient nitrogen deposition; and

- the total area of the SAC and total area of Annex I habitat within 200 m of the M25 are both <1% of the total resource while the total number of veteran trees within the same area is <1% of the total number.

4.32 It is concluded that, without mitigation, there is no potential for AEOI on Epping Forest SAC as a result of increased traffic flow on the M25 from the Stansted 35+ project alone. No mitigation is therefore necessary for the Stansted 35+ project when considered alone as AEOI is avoided.

Potential impacts of Stansted 35+ on SAC Features " In combination with other Plans & Projects"

4.37 In combination assessment is required as the project alone will not have AEOI of Epping Forest SAC but it may have an insignificant adverse effect. It is therefore necessary to extend the assessment to consider the cumulative effects of the Stansted 35+ project with other plans or projects.

4.38 The Waddenzee judgment provides a clear interpretation of the legislation protecting Habitats Sites. Paragraphs 53 and 54 of the Judgment state: "according to the wording of that provision [Article 6(3) of the Habitats Directive] an appropriate assessment of the implications for the site concerned of the plan or project must precede its approval and take into account the cumulative effects which result from the combination of the plan or project with other plans or projects in view of the sites conservation objectives. Such an assessment therefore implies that all the aspects of the plan or project which can, individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field

4.39 When considering the combined effects of plans or projects, the combined effect on the ecological functioning of the site interest feature must be considered carefully, as the effect can often be greater than the sum of each individual element. This effect is often referred to as a synergistic effect.

4.40 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important in ecological impact assessments as many ecological features are already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline. Effects can also make habitats and species more vulnerable or sensitive to change.

4.41 Different types of actions can cause cumulative impacts and effects:

- Additive/incremental – multiple activities/projects (each with potentially insignificant effects) added together to give rise to a significant effect due to their proximity in time and space. The effect may be additive (1+1 = 2) or synergistic (1+1 = 3).

- Associated/connected – a development activity 'enables' another development activity *e.g*. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process.

4.42 As the identified impacts on Epping Forest SAC relate to air quality, the other plans or projects under consideration are those for housing and commercial/industrial development proposed for other Essex and Hertfordshire authorities. This is particularly the West Essex/Hertfordshire HMA and Highways & Transport Infrastructure for Epping Forest District Council, Harlow District Council, East Herts District

Council, Uttlesford District Council as well as Essex County Council Highways, Hertfordshire County Council and Highways England.

4.43 It is noted that Natural England is working with the HMA Authorities towards agreeing and implementing an adequate monitoring programme and mitigation strategy to ensure the respective Local Plans are HRA compliant and "sound" to meet necessary timetables. The complexity of the "in-combination" assessment and developing mitigation for the cumulative impacts that is robust, meaningful and deliverable is a challenge.

4.44 The most recently submitted HRA (AECOM December 2017) associated with the Epping Forest District Council Local Plan is relevant and estimates an increase in two way AADT along the A121 (between Wake Arms roundabout and M25) by 2033 of between 879 and 1424. Natural England is of the opinion that these figures are regarded as an under-estimate of likely AADT figures for the reasons set out in their representations (for example Letter to EFDC dated 26 January 2018) and, as referenced in the meeting with Uttlesford District Council and the Stansted 35+ applicants of 20 June 2018.

4.45 However, Natural England considers that the HRA for EFDC Local Plan does provide a helpful insight into the predicted traffic increase on the B1393, which is immediately adjacent to the SAC and in the vicinity of the M25 modelled points (Stansted Airport HRA Table 1 & Figure 1 grid references). Natural England notes that the predicted AADT increase for the B1393, and the linked NOx emissions and Nitrogen deposition attributed to the EFDC Local Plan, is a maximum of 1637 (AADT), 1.4ug/m3 NOx and 0.06KgN/Ha/year. It should be noted that Natural England currently regard these figures as under-estimates for the reasons set out in their letter dated 26 January 2018).

4.46 Natural England advises that both Stansted Airport 35+ and the Local Plans are predicted to increase local road traffic (M25 and B1393) in the vicinity of Epping Forest SAC, specifically SSSI unit 105 with resultant increases in NOx concentrations and N deposition. It is unclear whether the M25 emissions will contribute in an additive or synergistic way to the B1393 emissions (attributable to the Local Plan) to effect the adjacent Epping Forest SAC. The predicted contributions (that must be viewed as under-estimates at the moment for reasons previously set out) from these respective sources and their combined total outputs to the SAC are as follows:

4.47 The total 'in combination' additive figure represents an increased contribution of 5% of the Critical Level for NOx and 0.8% of the Critical Load for Nitrogen deposition (using 30ug NOx m-3 and 10kg N/ha/year respectively for this local area of the SAC), which is far higher than any figures proposed in the submitted Stansted Airport 35+ HRA.

4.48 Noting the 'in combination' impact is an increase in Nitrogen deposition approaching 1% and this is currently regarded as an under-estimate (Letter to EFDC dated 26 January 2018), Natural England has adopted a precautionary position until the updated EFDC HRA information is available.

4.49 It is recognized that Epping Forest SSSI unit 105 (within SAC) has been subject to Nitrogen deposition above Critical Loads for a prolonged period and this has been identified as a 'SSSI Threat' and an 'SAC IPENS issue' since at least 2009 which is reducing the capacity for sensitive SAC features and their supporting habitats to maintain or achieve favourable condition and/or favourable conservation status. It should be noted the snapshot SSSI condition assessment is dated 2009 and based on the experience of more recent assessments in other Epping Forest SSSI units it is likely some of these features (*e.g.*, bryophytes) may not achieve favourable condition targets if assessed today.

4.50 In this situation, where parts of the SAC are regarded as being adversely affected by air quality (specifically SSSI within unit 105) with a number of character features (*e.g.*, tree condition, bryophyte assemblage, epiphytic and ground flora) in sub-optimal condition, it is appropriate to regard the woodland feature (and its characteristic elements) of the SAC as vulnerable and unlikely to maintain (and/or achieve) favourable condition status if air quality thresholds continue to be exceeded.

4.51 Natural England has advised that both Stansted Airport 35+ and the Local Plans are predicted to increase local road traffic (M25, A121) in the vicinity of Epping Forest SAC, specifically at this location within SSSI unit 109, with resultant increases in NOx concentrations and N deposition. The predicted contributions (that must be viewed as under-estimates at the moment for reasons previously set out) from these respective sources and their combined total outputs to the SAC are as follows:

4.52 It is unclear whether the M25 emissions for NOx concentrations (ug/m3) will contribute in an additive or synergistic way to the A121 emissions (attributable to the Local Plan) to effect the adjacent Epping Forest SAC. The 'in combination' contributions of increased NOx and Nitrogen deposition that add pollutants and delay recovery of air quality to achieve suitable critical levels and loads have been shown to be insignificant and therefore avoids AEOI of Epping Forest SAC.

4.53 The M25 traffic emissions attributable to the Stansted 35+ development are regarded as negligible in the area of SSSI unit 109, and therefore can be screened out of the 'in combination' assessment. This leaves EFDC with the ongoing responsibility of assessing the impact of predicted traffic increase in A121 as part of their Local Plan HRA assessments.

4.54 The HMA authorities are in discussion with Natural England and the CoLC to agree a mitigation strategy to avoid AEOI of Epping Forest SAC from their Local Plans. Traffic and air quality modelling and the testing & securing of specific mitigation measures will be an iterative process although there is firm commitment to the development of mitigation strategies to address air quality around the SAC. The HMA authorities also commit to monitor the efficacy of the strategies to ensure no AEOI for Epping Forest SAC.

4.55 Natural England acknowledges that the HMA (and/or EFDC) Mitigation Strategy is not currently in place and it will take time to progress towards a satisfactory solution to meet Local Plan requirements to avoid AEOI for Epping Forest SAC. Opportunities should exist to provide adequate planning-linked conditions and obligations to align the Stansted 35+ project with the emerging HMA Mitigation Strategy for Air Quality. In line with Natural England's DAS letter (10 May 2018), the plans or projects listed in Table 4.56 are considered for in-combination effects with the Stansted 35+ project. These include the Local Plans for the relevant Local Planning Authorities within the HMA (Epping Forest District Council, Harlow District Council, East Herts District Council, Uttlesford District Council) and relevant Highways Plans/Infrastructure Projects (Essex County Council, Highways Agency and Herts CC). In addition to this, the linked strategic framework of Habitats Regulations Assessments for Local Plans within the vicinity of Epping Forest SAC extends to some extent to include some London Boroughs (e.g., Waltham Forest, Newham, Redbridge) and the London Plan. However the major impact is likely to be that of housing and commercial development within the Zone of Influence for Epping Forest SAC and therefore the focus for this In-combination assessment.

4.56 The HRAs for plan or projects listed in Table 4.56 that have been carried out have confirmed that these will results in a likely significant effect on Epping Forest SAC either alone and/or in combination. Following the CJEU People over Wind ruling, the HMA authorities and highways authorities are now considering further assessment and strategic mitigation.

Table 4.56: Other plans or projects considered for in combination effects

Plan/Project	Potential for in combination effects
Epping Forest District Council Local Plan	Yes (HMA authority)
Uttlesford District Council Local Plan	Yes (HMA authority) .
Harlow District Council Local Plan	Yes (HMA authority) .
East Herts District Council Local Plan	Yes (HMA authority) .
London Plan	Yes
London Borough of Waltham Forest Local Plan	Yes
London Borough of Newham Local Plan	Yes
London Borough of Redbridge Local Plan	Yes
Minerals and Waste Development Plan for Essex	May contribute to increased vehicle movements on the road network within Epping and thereby contribute to air quality impacts
Minerals and Waste Development Plan for Cambridgeshire	
Minerals and Waste Development Plan for Hertfordshire	
Minerals and Waste Development Plan for London	
Essex Local Transport Plan	Important in terms of encouraging sustainable transport
Hertfordshire Local Transport Plan	
Cambridgeshire Local Transport Plan	
Highways Agency scheme M11 junctions 6 to 8 maintenance works	Yes

4.57 The proposed Stansted Airport 35+ development acting 'in combination' with other plans or projects (*i.e.*, HMA Local Plans) only makes an insignificant contribution to perpetuating the situation of the Critical Loads and Levels being exceeded.

4.58 Based on the submitted figures, it is considered that the proportionate contribution of emissions from the Stansted Airport 35+ development will be *de minimis* and lower than the contribution from the HMA Local Plans.

4.59 No mitigation is therefore necessary for the Stansted 35+ project when considered in combination with other plans and projects as AEOI is avoided.

5 Conclusion

5.1 In an Appropriate Assessment, it is necessary to determine whether the project or plan would adversely affect the integrity of the designated site, in the light of the site's conservation objectives. The integrity of a site has previously been defined as the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

5.2 The Information to support HRA report (RPS, June 2018) addresses the concerns that habitats and interest features of Epping Forest SAC may be affected by the Stansted 35+ project and informs this Appropriate Assessment. In light of the assessment presented, all the impacts - whether direct or indirect, permanent or temporary - to interest features, the question is whether adverse effect on site integrity of Epping Forest SAC will be avoided.

5.3 The tests for AEOI for Epping Forest SAC have been met as follows:

- The area of Annex 1 habitats (or composite features) will not be reduced by the Stansted 35+ Project either alone and/or in combination with other plans/projects;

- There will be no direct adverse effects by the Stansted 35+ Project (either alone and/or in combination with other plans/projects) on the population of the Annex II species for which the site was designated or classified;

- There will be only *de minimis* indirect adverse effects by the Stansted 35+ Project (either alone and/or in combination with plans/projects) on the populations of the Annex II species for which the site was designated due to loss or degradation of their habitat (quantity/quality);

- There will be no changes by the Stansted 35+ Project (either alone and/or in combination with other plans/projects) to the composition of the habitats for which the site was designated (eg, reduction in species structure, abundance or diversity that comprises the habitat over time);

- The Stansted 35+ Project (either alone and/or in combination with other plans/projects) will not interrupt or degrade the physical, chemical or biological processes that support habitats and species for which the site was designated or classified.

5.4 For the purposes of supporting (or otherwise) the conclusion of no AEOI from the Stansted 35+ project, further assessment of the Epping Forest SAC in relation to the M25 has therefore been undertaken. Based on a Do-Minimum scenario that accounts for the diversion of passengers to other airports in the event that the Stansted 35+ application is unsuccessful, the Do-Something scenario shows a net decrease in traffic on the M25 adjacent to the SAC. Therefore, rather than an additional 1,493, as reported in the body of the TA, a more reasonable assumption for change in AADT due to Stansted 35+ would be between -15 and -184, depending on where the passengers redirect to as a result of Stansted 35+ not going ahead.

5.5 Notwithstanding this, additional modelling of changes in air quality show that both NOx concentration and nutrient nitrogen deposition has been undertaken for the AADT change of 1,493 in the absence of any form of passenger redirection. Maximum values for both are <1% of the relevant thresholds at the edge of Epping Forest SAC and decrease rapidly with distance into the designated site. Given that the TEMPro model used within the traffic modelling for Stansted 35+ project incorporates traffic growth associated with a strategic road such as the M25, these data are relevant for both alone and in-combination scenarios.

5.6 Also, a further survey of the vegetation present in the north of Epping Forest SAC identified that no heathland habitats occurred within 200 m of the M25. The survey noted that 0.85% of the Annex 1 woodland habitat (5.53 ha of a total of 652.3 ha) and 0.34 % of the total SAC area occurred within this 200m buffer from the M25 and that this unit (Unit 105) is recorded as being in favourable condition. The total number of veteran trees present (as the key hosts for the most sensitive epiphytes) was 8, <0.016% of the total resource within Epping Forest SAC.

5.7 It is therefore concluded that, the Stansted 35+ project for the proposed expansion of airside infrastructure at Stansted Airport to make the best use of the he existing runway as well as an associated increase in passenger numbers, known as the Stansted 35+ application, will have no AEOI of Epping Forest SAC as no failure of the conservation objectives is predicted, either alone or in combination. The development can therefore, subject to other considerations, be granted consent and Uttlesford DC can demonstrate its compliance with the UK Habitats Regulations 2017.

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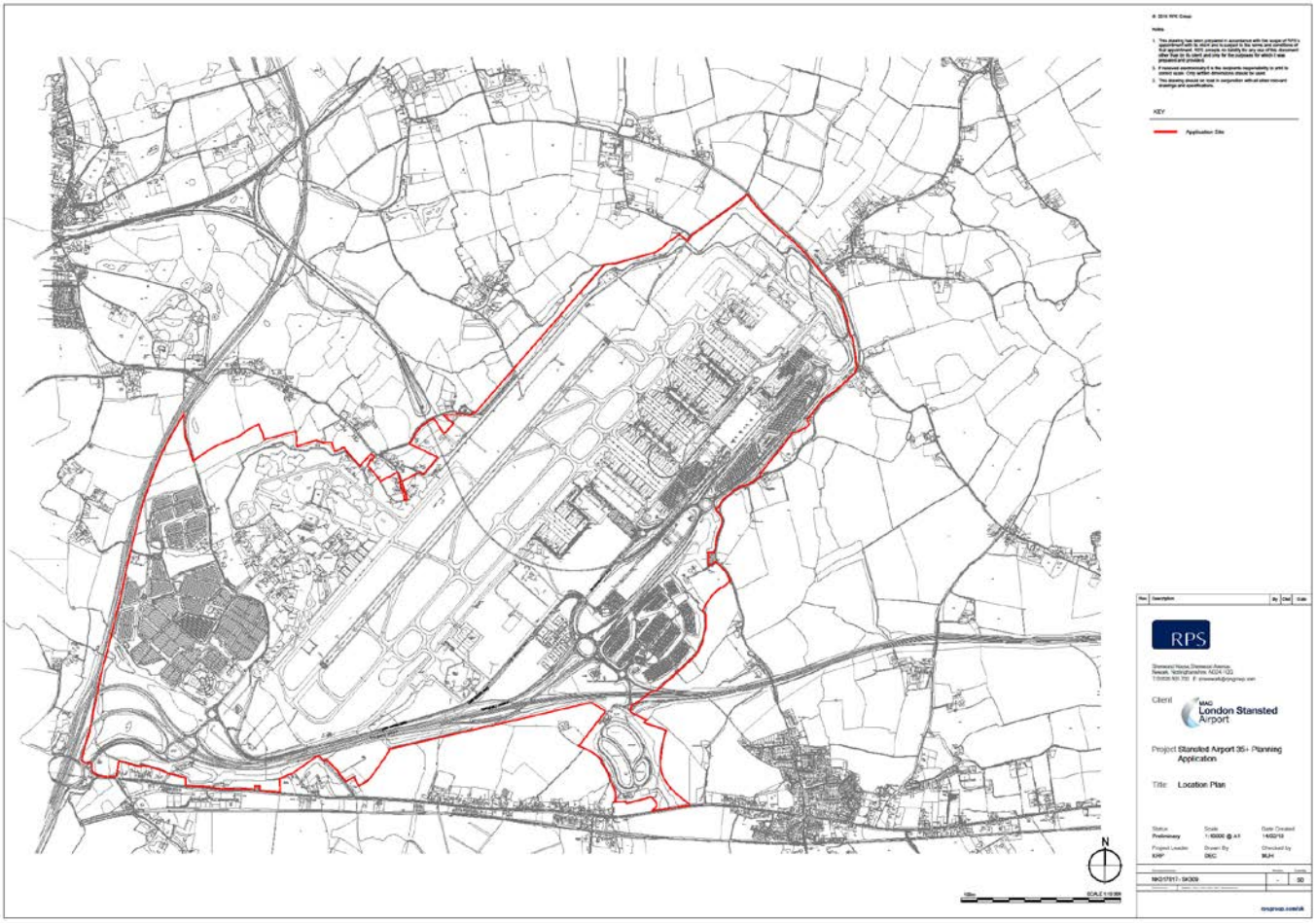
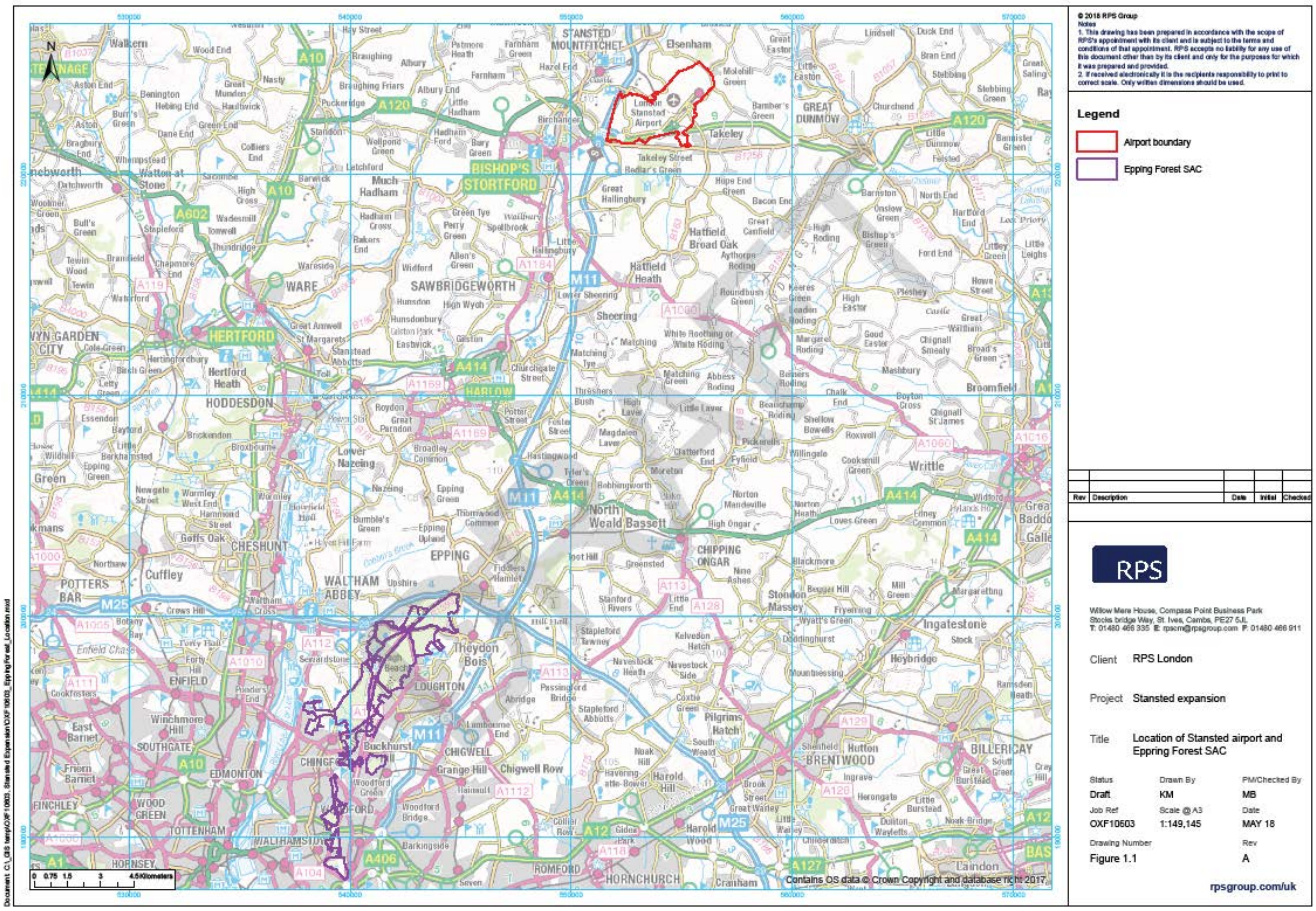
7 Appendices

Appendix 1 Map of site location for Stansted Airport



Appendix 2 Map showing the location of the site in relation to the European sites (RPS, June 2018)



Appendix 3 Favourable Conservation tables for Epping Forest SAC

Epping Forest is a former royal forest and ancient wood-pasture of international conservation importance owned and managed by the City of London Corporation. The entire Forest land is 2,400 hectares approximately 19 kilometres long (north-south) situated between Epping in the north and Wanstead in the south. The Forest occupies a long and relatively narrow area of higher ground between the river valleys of the Lea and Roding, straddling the border between Greater London and Essex.

Over two-thirds of the Forest area is classified as a SAC and is within the North Thames Basin National Character Area.

The site lies on a ridge of London clay overlain in places by Claygate Beds and in the highest areas by Bagshot Sand and Pebble Gravel. This varied geology gives rise to a mosaic of soil types from neutral soils to acidic loams and from impervious clays to well-drained gravels.

The site supports a mosaic of habitats of high nature conservation value characteristic of ancient wood-pasture including ancient semi-natural woodland, old grassland plains, wet and dry heathland and scattered wetlands, including rivers, streams and bogs. The semi-natural woodland is particularly extensive but the Forest plains are also a major feature and contain a variety of unimproved acid grasslands.
The semi-natural woodlands of Epping Forest include important beech *Fagus sylvatica* forests on acid soils, which are important for a range of rare epiphytic communities, including the Knothole moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also nationally important for its fungi and dead wood (saproxylic) invertebrates. Records of stag beetle *Lucanus cervus* are also widespread and frequent. Areas of acidic grassland transitional with heathland are generally dominated by a mixture of fine-leaved grasses. In marshier areas, purple moor-grass *Molinia caerulea* frequently becomes dominant. Broad-leaved herbs typical of acidic grassland and heathland are frequent, including heather *Calluna vulgaris*. The site also contains an example of wet dwarf-shrub heath with both heather and cross-leaved heath *Erica tetralix.*

The Conservation Objectives for Epping Forest SAC can be viewed at
http://publications.naturalengland.org.uk/category/6490068894089216

For the purposes of preparing for or undertaking an assessment required by the Conservation of Habitats and Species Regulations 2010 (as amended), all of the qualifying features listed below must all be treated equally.

The following Annex I natural habitat types and/or Annex II species of European importance were the primary reason for the initial selection of this SAC:
H9120. Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*); Beech forests on acid soils

This qualifying habitat comprises beech *Fagus sylvatica* forests with holly *Ilex*, growing on acid soils, in a humid Atlantic climate. Epping Forest is within the north-eastern part of the habitat's UK range. Sites of this habitat type often are, or were, managed as wood-pasture systems, in which pollarding of beech and oak *Quercus* spp. was common. This is known to prolong the life of these trees.

The vegetation which comprises this habitat falls within three UK National Vegetation Classification (NVC) community types:
• W14 *Fagus sylvatica – Rubus fruticosus* woodland
• W15 *Fagus sylvatica – Deschampsia flexuosa* woodland
• W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland

Typical species include holly *Ilex aquifolium*, bracken *Pteridium aquilinum* and bramble *Rubus fruticosus*, with wavy hair-grass *Deschampsia flexuosa* in the most acidic areas.

Epping Forest SAC contains an extensive area of former beech *Fagus sylvatica* wood-pasture with many old pollards and associated beech and oak *Quercus* spp. Holly *Ilex aquifolium* and honeysuckle *Lonicera periclymenum* are significant components of the shrub layer of the woodlands, with occasional Yew *Taxus baccata* and presence of *Ruscus aculeatus.* The ground flora is frequently dominated by Bracken *Pteridium aquilinum* and brambles *Rubus fruticosus* agg., but more varied mosaics and transitions include scattered patches of wavy hair-grass *Deschampsia flexuosa;* cushions of the distinctive moss *Leucobryum glaucum;* and acid grassland-heathland plants such as *Teucrium scorodonia* and *Calluna vulgaris*.
Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the Knothole moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi, dead-wood invertebrates and notable bryophytes and lichens.

S1083*. Lucanus cervus*; Stag beetle.
The decaying timber in the large woodland area of Epping Forest supports a large population of stag beetle *Lucanus cervus.* The stag beetle requires decaying wood to complete its lifecycle. Its eggs are laid underground in the soil next to logs or the stumps of dead trees (typically apple *Malus* spp., elm *Ulmus* spp., lime *Tilia* spp., beech *Fagus sylvatica* and oak *Quercus* spp.). The beetle larva (or grub) will spend up to seven years in the wood, slowly growing in size. Timber is also utilised, especially sunken fence posts.
Adult stag beetles emerge from mid-May until late July. Males emerge earlier to actively search for females to mate, and can often be seen flying on sultry summer evenings an hour or two before dusk. As adults they are short-lived and generally die after mating, although occasionally some may over-winter in sheltered warm places.

Epping Forest SAC has a large number of ancient trees with decaying timber and a diversity of tree species, habitat structure and canopy conditions characteristic of former royal forests and wood-pasture. The site straddles the Essex and east London population centres of the species and records are widespread and frequent in the SAC. Epping Forest is a site of national importance for the conservation of the fauna of invertebrates associated with the decaying timber of ancient trees.

The following natural habitat types and/or Annex II species of European importance form important qualifying features of the site and added further justification for the selection of the Epping Forest as a SAC within the Natura 2000 network;

H4010. Northern Atlantic wet heaths with Erica tetralix; Wet heathland with cross-leaved heath
Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses. At this site, this Annex 1 habitat feature is known to predominantly comprise the following UK National Vegetation Classification (NVC) community; M16 *Erica tetralix - Sphagnum compactum* wet heath.

H4030. European dry heaths
European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather *Calluna vulgaris*, which often occurs in combination with gorse *Ulex* spp., bilberry *Vaccinium* spp. or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most dry heaths are managed as extensive grazing for livestock or, in upland areas, as grouse moors.
At this site, this Annex 1 habitat feature is known to predominantly comprise the following UK National Vegetation Classification (NVC) community; H1 *Calluna vulgaris - Festuca ovina* heathland.

Additional Site Notes
The habitat features will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK the core habitats have been broadly categorised by the National Vegetation Classification (NVC) but it should be acknowledged within assessments that conserving the transitions and mosaics with other habitat-types and NVC communities may be important component of favourable conservation status. Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature and the biodiversity it supports. For example, Wet Heathland (M16) may include transitions and mosaics with *Sphagnum* bogs (M-type) and wet acid grasslands. Dry Heathland (H1) may include transitions and mosaics with dry acid grasslands (U1 –types).

This SAC classified area within Epping Forest includes three of the main wood pasture types in Britain namely Beech-Oak, Hornbeam–Oak and mixed Oak. The H9120 community and the broader mosaics and transitions characteristic of ancient forests and wood-pastures are well-represented within the site. Maintaining this characteristic diversity and range is critical for the conservation of site features (eg, H9120 and stag beetles) and site integrity.

In addition to this, it is also important to maintain the associated characteristic habitats (such as heathlands, grasslands and wetlands and the overall transitions/mosaics) which add to the site biodiversity in appropriate locations.

Epping Forest SAC Standard Data Form (taken from RPS, June 2018)

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee 25 January 2016.

http://jncc.defra.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and for
Special Areas of Conservation (SAC)

SITE **UK0012720**

SITENAME **Epping Forest**

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1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0012720

1.3 Site name

Epping Forest

1.4 First Compilation date	1.5 Update date
1996-01	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:

Date site proposed as SCI:	1996-01
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
0.0225	51.64416667

2.2 Area [ha]:

1630.74

2.3 Marine area [%]

0.0

2.4 Site length [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKI2	Outer London
UKH3	Essex

2.6 Biogeographical Region(s)

Atlantic (100%)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4010			3.26		G	C	C	B	C
4030			11.42		G	C	C	B	C
9120			652.3		M	A	B	A	A

PF: for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
NP: in case that a habitat type no longer exists in the site enter: x (optional)
Cover: decimal values can be entered
Caves: for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
I	1083	Lucanus cervus			p				P	DD	C	A	C	B
A	1166	Triturus cristatus			p				P	DD	D			

Group: A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
NP: in case that a species is no longer present in the site enter: x (optional)
Type: p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
Unit: i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
Abundance categories (Cat.): C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N09	20.0
N16	70.0
N07	0.2
N08	3.8
N06	6.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: acidic,neutral,sand,clay 2 Terrestrial: Geomorphology and landscape: lowland

4.2 Quality and importance

Northern Atlantic wet heaths with Erica tetralix for which the area is considered to support a significant presence. European dry heaths for which the area is considered to support a significant presence. Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) for which this is considered to be one of the best areas in the United Kingdom. Lucanus cervus for which this is one of only four known outstanding localities in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative impacts	Positive Impacts

Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]	Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	M02	H	M02	H	M02	H	M02
H	H04	H	H04	H	H04	H	H04
H	G01	H	G01	H	G01	H	G01
H	J02	H	J02	H	J02	H	J02
H	A04	H	A04				

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
X	N

Appendix 4 – Redistribution Traffic Modelling

steer davies gleave

Technical Note

To	Natural England		
Cc	Stansted Airport Limited, RPS		
From	Steer Davies Gleave		
Date	15 December 2017		
Project	Stansted 35+ Project	Project No.	23003401

Epping Forest SSSI – Impact of Stansted 35+ Project

Introduction

1. *Steer Davies Gleave (SDG) was commissioned by Stansted Airport Limited (STAL) to provide surface access transport consultancy advice in support of the planning application to increase the allowable passenger throughput at Stansted Airport from 35 million passengers per annum (mppa) to 43mppa (hereby referred to as the 'Stansted Airport 35+ Project').*

2. An Environmental Statement (ES) scoping report was produced for the proposed planning application and issued to a number of stakeholders in July 2017. Natural England (NE) was amongst the stakeholders approached for comment. NE is the UK government's statutory advisor for the natural environment, who "*help to protect England's nature and landscapes for people to enjoy and for the services they provide*".

3. *In response to the ES scoping report, NE set out the following response regarding the Epping Forest SSSI:*

   "we advise that your ES submission needs to include a traffic assessment with predictions for traffic levels including key roads near Epping Forest SAC, SSSI. It should be noted that the current baseline levels of road traffic movements are for aircraft passenger levels (and staffing/operational traffic associated with current operations) are below the permitted passenger levels of 35mppa, so predictions need to be provided for road traffic movements that would meet the 35mppa level within indicated growth timetables and to meet 43mppa within the timetables indicated."

4. *Epping Forest SSSI comprises 1,728 hectares of land and expands across Epping Forest District, London Borough of Waltham Forest and the London Borough of Redbridge.*

5. It was designated as an SSSI in 1953 (Under 1949 Act) and 1980 (Under 1981 Act). It is one of few remaining large-scale examples of ancient wood-pasture in lowland Britain. The environment has retained "*habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains and scattered wetland*". The semi-natural woodland is particularly extensive, forming one of the largest coherent blocks in the country. Another major feature is the forest plains, which contain a variety of unimproved acid grasslands, uncommon elsewhere in Essex and London. Epping Forest SSSI also supports "*a nationally outstanding assemblage of invertebrates, major amphibian interest and an exceptional breeding bird community*".

6. *It is considered that the key consideration is the impact associated with an increase in vehicular traffic on the M25, Junction 26-27 link associated with a proportion of the additional 8 million passengers.*

7. *This note sets out the forecast traffic flows expected on this link of the M25 as a result of the passenger cap increase at Stansted Airport, compared to consented conditions, i.e. the vehicle movements associated with 8 million additional passenger movements and associated increased employee vehicle trips, both taking into account predicted modes of travel and average car occupancies.*

8. *It sets out a comparison of the additional traffic flows to and from Stansted Airport for the Stansted Airport 35+ Project compared to the volume of traffic that would utilise this link of the M25 should the 8 million passengers use alternative airports once Stansted Airport reaches its current 35mppa cap.*

Methodology

Passenger and Employee Forecasts

9. *To inform the surface access travel patterns at Stansted Airport for the existing and future baselines, the following data sources have been used to derive up-to-date and robust information:*

- *Civil Aviation Authority (CAA) 2016 Passenger Survey data;*
- *ICF Passenger Outputs (2016); and*
- *Employee Travel Survey (2015).*

10. *These sources were used to derive existing and future baseline passenger and employee modes of travel and places of residence; to inform the distribution of employees and passengers travelling to/from Stansted Airport, and to further delineate the proportion that would travel via the M25 (J26-27).*

Mode Share

11. *The mode share from the 2016 CAA passenger survey was used to derive the number of vehicle trips for passengers in 2028.*

12. *The baseline modal split for employees was forecast from the Employee Travel Survey (2015). The future mode share for employees was derived from the existing modal share and the targets outlined in Stansted Airport's 2015 Sustainable Development Plan to reduce the number of single car occupancy trips for employees at Stansted Airport.*

13. *The proportion of the mode share which comprises vehicle trips for passengers and employees in 2028, is therefore shown in Table 1.*

Table 1: Future Vehicular Mode Share – Passengers and Employees

	Proportion of Vehicle Trips (%)*
Passengers	50%
Employees	55%

*This includes all trips made by car, car passenger and taxis. An average occupancy of 1.6 persons was applied to car passenger and taxi trips to derive the number of vehicles. More information is provided in Technical Note 01 and the Transport Assessment.

14. *To forecast the quantum of vehicle trips generated by passengers and employees in the 2028 35mppa and 2028 43mppa future year scenarios, the average daily passenger and employee forecasts were applied to the vehicle mode splits presented in Table 1. These results are shown in Table 2.*

Table 2: Average Total Daily Vehicle Trips

Scenario	Daily Passenger Vehicle Trips	Daily Employee Vehicle Trips	Total
2028 (35mppa) 'Do Minimum'	36,454	8,163	**44,617**
2028 (43mppa) 'Do Something'	42,815	10,018	**52,833**

Place of Residence

15. *In order to determine the proportion of persons (passengers and employees) using the M25 (J26-27) link, a trip origin/destination was assigned to predicted trips. The surface origin of air passengers was derived*

from the CAA 2016 passenger survey. The 2015 Employee Survey informed the distribution of employees. The baseline trip distribution was also used to inform the 2028 scenarios, as the catchment for passengers and employees is not anticipated to alter significantly. Table 3 shows the aggregated distributions for passengers and employees.

Table 3: Place of Residence – Passengers and Employees

	Passengers	Employees
East Midlands	6%	1%
West Midlands	2%	0%
Southwest and Wales	3%	0%
East Anglia	13%	7%
Outer South East NW	3%	2%
Outer South East NE	14%	77%
Outer South East SE	3%	1%
Outer South East SW	2%	1%
Inner London	31%	1%
Outer London NE	7%	6%
Outer London NW	9%	3%
Outer London SE	2%	1%
Outer London SW	2%	0%
Rest of UK	2%	0%
Total	**100%**	**100%**

Routing of Passengers and Employees

16. *Future additional traffic flows on the M25 (J26-27) link were forecast using the system application 'Network Analyst' in ArcGIS to assign the trip distribution to the highway network based on lowest journey times.*

17. *The network used was 'Pitney Bowes 2016 Speed profiles – Night (22:00 – 04:00)', which provides a reliable proxy for free flow conditions and suitable for the 24 hour operation at the airport. This was then edited by SDG to account for the A14 improvements and Huntingdon Bypass which will be complete and operational by 2028.The national speed limit was adopted as the link speed for this new route.*

18. *The network was used to calculate the quickest timed routes from weighted population centres from each residential district to the Airport. The districts were weighted according to population density, which was calculated by deriving the median coordinates for each district, weighted by population at Lower Super Output Area (LSOA) level (2011). A number of employee/passenger vehicles were assigned to each district, based on the relative size (area) of each district, compared with the overall aggregate zone where:*

$$\left(\frac{\text{District Population}}{\text{Total zone population}}\right) \times \text{No. of passengers and employees in the overall zone}$$

19. *It was then assumed that all passengers and employees within each district took the fastest route to Stansted Airport. Passenger only trips were calculated for the alternative airports tested, as the number of employees affected is not directly comparable. Employee travel characteristics are usually determined by locality.*

Results

Travel to Stansted Airport

20. *In order to quantify the increase in traffic posed by the passenger cap application for 43mppa, results were produced for:*

    - *2028 (35mppa) 'Do Minimum' Scenario; and*
    - *2028 (43mppa) 'Do Something' Scenario.*

21. *The distribution of passengers and employees to/from Stansted Airport as derived from the existing passenger and employee surveys, is presented in Figure 1.*

Figure 1: Passenger and Employee Routing to Stansted Airport

22. *Based on the passenger and employee routings shown in Figure 1, the proportion of vehicle trips via the M25 (J26-27) link was derived. Table 4 illustrates the number of vehicles per scenario which are predicted to travel via the M25 (J26-27) link, according to place of residence.*

Table 4: Vehicle movements on M25 (J26-27) – Stansted Airport

Aggregate zone	Travel to Stansted Airport on M25 (J26-27)						
	Projected Employees (2028 35mppa)	Projected Employees (2028 43mppa)	Difference in Employees (2028 35mppa vs 43mppa)	Projected Passengers (2028 35mppa)	Projected Passengers (2028 43mppa)	Difference in Passengers (2028 35mppa vs 43mppa)	Total Difference (Employees + Passengers)
East Midlands	1	1	**0**	57	70	**13**	**13**
West Midlands	0	0	**0**	0	0	**0**	**0**
Southwest and Wales	10	12	**2**	768	944	**176**	**178**
East Anglia	0	0	**0**	0	0	**0**	**0**
Outer South East NW	84	103	**19**	1,316	1,618	**302**	**321**
Outer South East NE	1,016	1,246	**231**	1,392	1,711	**319**	**550**
Outer South East SE	0	0	**0**	0	0	**0**	**0**
Outer South East SW	31	38	**7**	606	745	**139**	**146**
Inner London	0	0	**0**	0	0	**0**	**0**
Outer London NE	0	0	**0**	0	0	**0**	**0**
Outer London NW	54	66	**12**	1,188	1,460	**272**	**284**
Outer London SE	0	0	**0**	0	0	**0**	**0**
Outer London SW	0	0	**0**	0	0	**0**	**0**
Rest of UK	0	0	**0**	0	0	**0**	**0**
Total	**1,195**	**1,466**	**271**	**5,327**	**6,549**	**1,222**	**1,493**

23. *As Table 4 shows, a combined total of 1,493 daily trips are predicted for the M25 (J26-27) link in the 2028 (43mppa) 'Do Something' scenario compared to the consented 2028 (35mppa) 'Do Minimum' results to Stansted Airport.*

24. *The largest proportion of passengers using the M25 (J26-27) are located in the 'Outer South East NE' and 'Outer South East NW' zones., with a similar distribution of employees.*

25. *Figure 2 and Figure 3 visually present the proportion of trips made by passengers and employees respectively to Stansted Airport, between the two scenarios tested.*

Figure 2: Proportion of Passengers using the M25 (J26-27) link – Stansted Airport

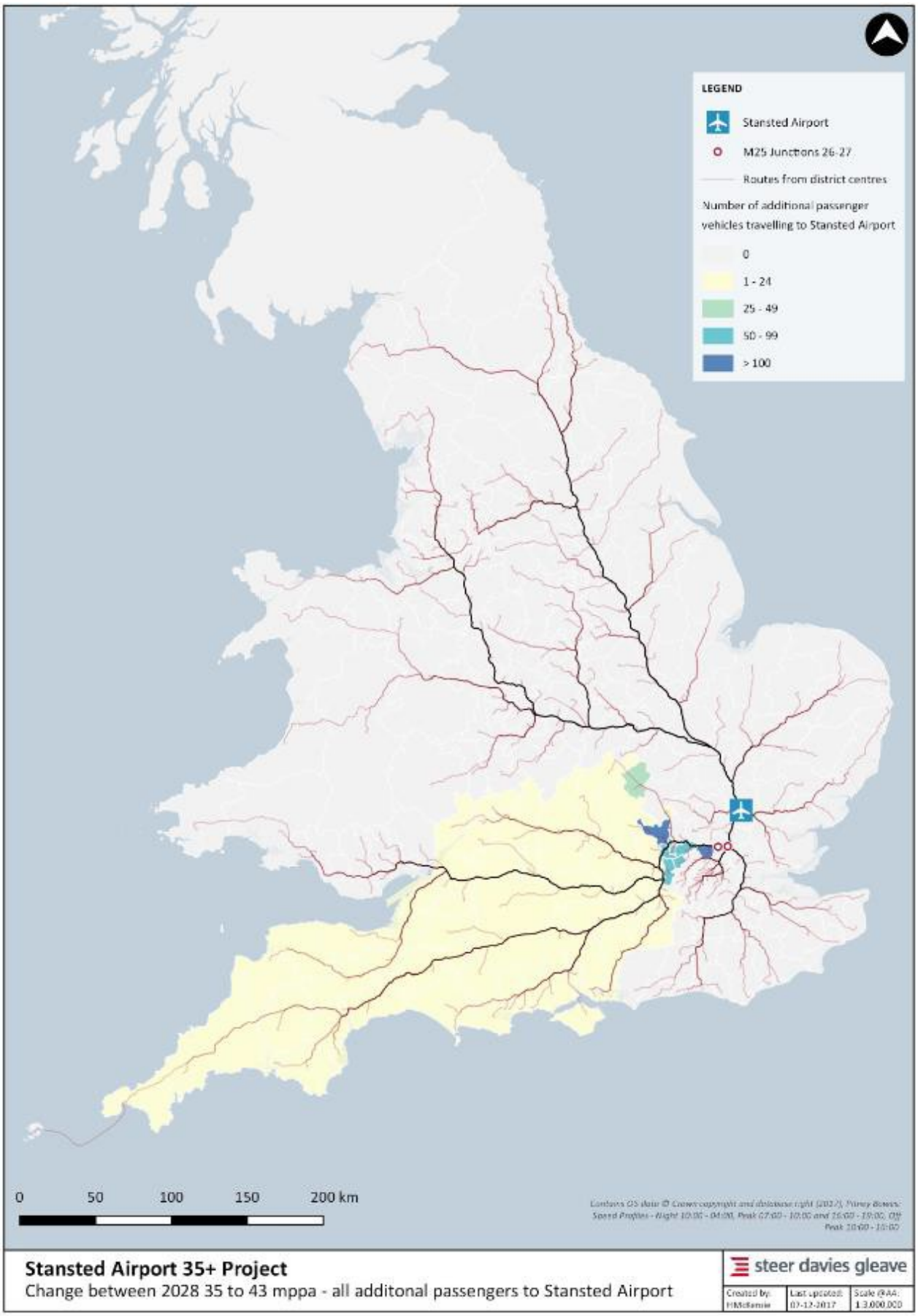
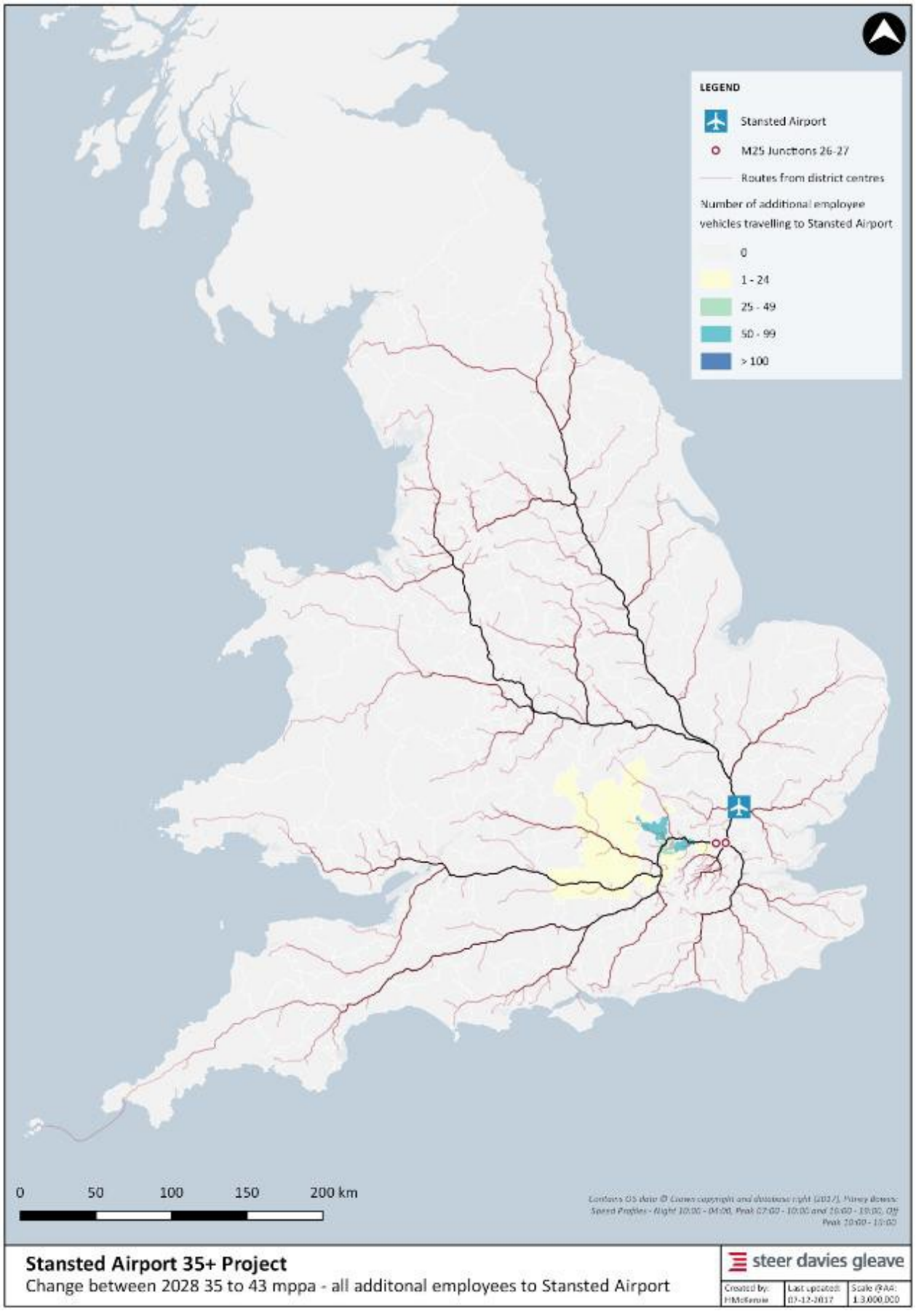


Figure 3: Proportion of Employees using the M25 (J26-27) link– Stansted Airport



Potential Future Travel – Other Airports

26. *The Department for Transport predicts a steady increase in air travel demand and their modelling suggests that demand distributes between airports based on ability to handle demand. Hence, whilst the increased cap application will attract vehicular trips on the M25 (J26-27) link for travel to and from Stansted Airport; without the cap application, the same 8mppa passengers will still be expected to travel, but via other UK Airports where there is suitable capacity.*

27. *The potential for associated vehicle trips to otherwise use the M25 (J26-27) link for travel to other UK Airports has therefore been analysed to consider the impact of the Stansted 35+ Project, compared to alternative of increased passenger travel to other airports.*

28. *In the current absence of alternative permitted expansion of other south-east England airports, the airports selected for analysis are as follows:*

- *Birmingham Airport;*
- *East Midlands Airport; and*
- *Bristol Airport.*

29. *All of the options above have been considered as they display 'spare' operating capacity at 2028, sufficient to accommodate, between them, the displaced 8mppa. In order to provide a simple direct comparison, three scenarios have been tested:*

- ***Option 1** – All Passengers displaced to Birmingham Airport;*
- ***Option 2** – All Passengers displaced to East Midlands Airport; and*
- ***Option 3** – All Passengers displaced to Bristol Airport.*

30. *In practice, any displacement would be expected to be a mix of the three options. No London-based Airports were tested as all are projected to be operating at capacity by 2028[1].*

Option 1 – All Passengers displaced to Birmingham Airport

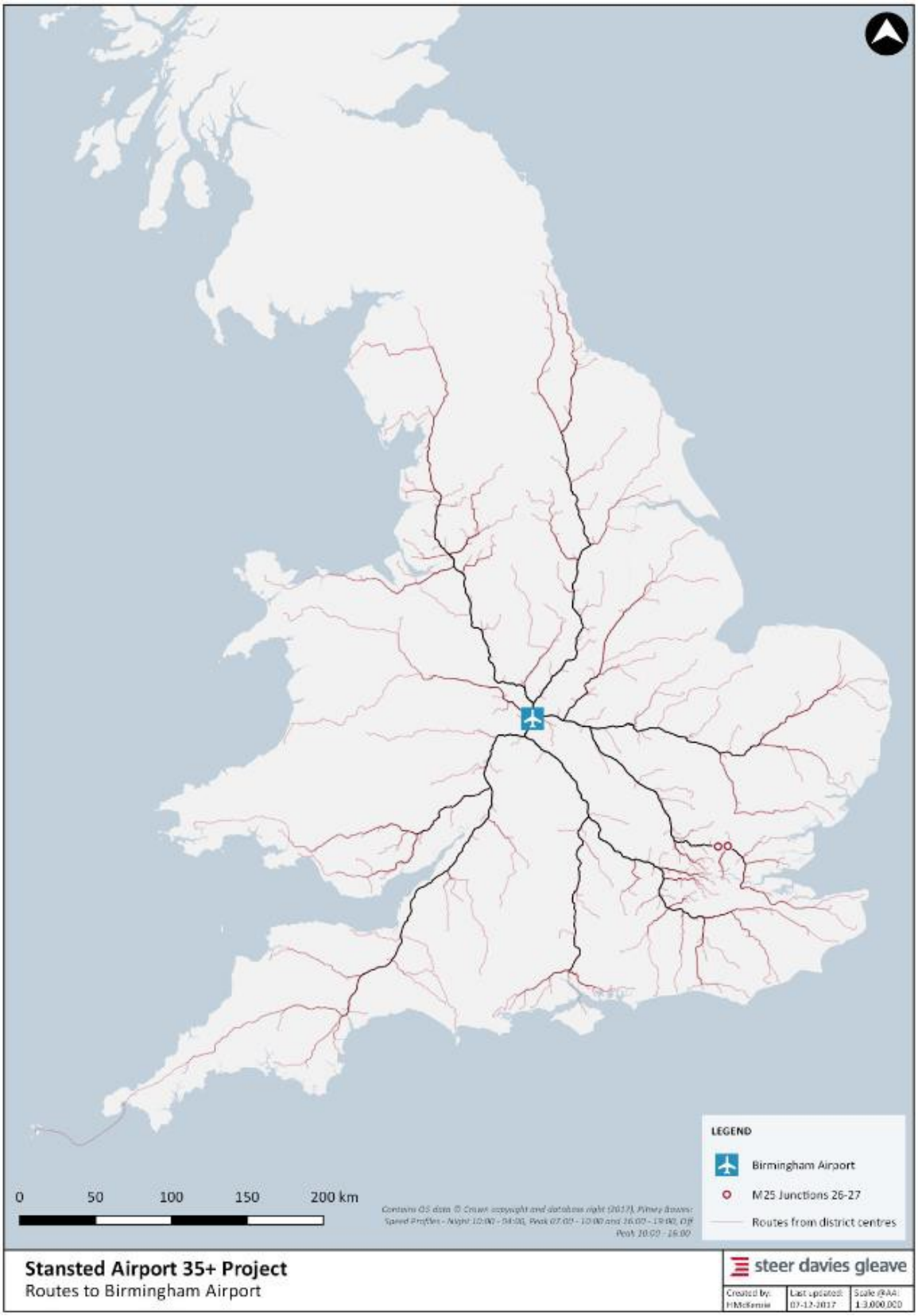
31. *Birmingham Airport is the seventh largest airport in the UK, located in the Metropolitan Borough of Solihull, eight miles south east of Birmingham city centre.*

32. *In 2016, a total of 11.6 million passengers were recorded to travel through Birmingham Airport (CAA passenger survey, 2016). The maximum throughput of passengers is estimated presently at 27mppa (Towards 2030 (Airport Masterplan to 2030), Birmingham Airport 2007). It is noted that a new masterplan is being prepared by the airport to support further growth to 55mpaa by 2050.*

33. *The routing of passengers to/from Birmingham Airport, based on the origins presented in Table 3 and the same assignment technique as adopted above, is presented in Figure 4.*

[1] It is acknowledged that London Heathrow Airport will not have a third runway by 2028, and forecasts show that 2030 is a realistic timescale for opening.

Figure 4: Passenger Routing to Birmingham Airport



34. *The assignment of vehicle trips via the M25 (J26-27) link was derived based on the passenger routings shown in Figure 4. Table 5 illustrates the number of vehicles per scenario which are predicted to travel across the M25 (J26-27) link, according to place of residence.*

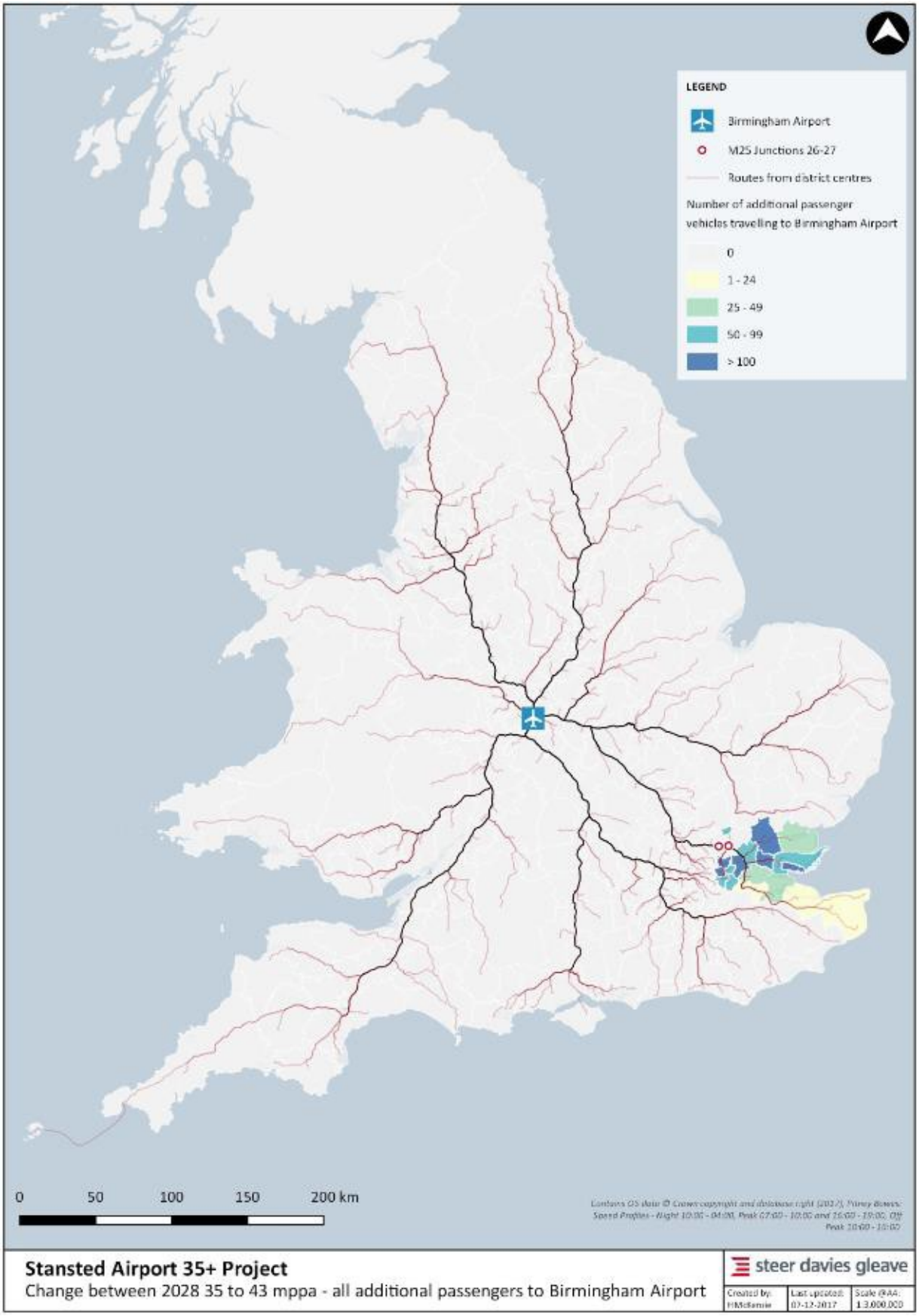
Table 5: Vehicle movements on M25 (J26-27) – Birmingham Airport

Aggregate Zone	Total additional Employee and Passenger trips to Stansted Airport 2028 43 (8mppa)	Displacement of additional Passenger trips to Birmingham Airport 2028-43 (8mppa)	Difference in M25 (J26-27) trips (+/-)
Rest of UK	0	0	0
East Midlands	13	0	-13
West Midlands	0	0	0
Southwest and Wales	179	0	-179
East Anglia	0	0	0
Outer South East NW	321	0	-321
Outer South East NE	550	684	+134
Outer South East SE	0	184	+184
Outer South East SW	146	0	-146
Inner London	0	74	+74
Outer London NE	0	516	+516
Outer London NW	285	0	-285
Outer London SE	0	52	+52
Outer London SW	0	0	0
Total	**1,493**	**1,508**	**+15**

35. *As Table 5 shows, a total of 1,508 passenger related vehicle trips would use the M25 (J26-27) link to travel to Birmingham Airport in the absence of the 35+ Project at Stansted Airport. This is 15 more vehicle trips than the traffic increase forecast for this link associated with travel to and from Stansted Airport with the 35+ Project including Passengers and employees.*

36. *Figure 5 visually present the origin/destinations of the displaced passengers respectively to Birmingham Airport.*

Figure 5: Proportion of Passengers using the M25 (J26-27) – Birmingham Airport



Option 2 – All Passengers displaced to East Midlands Airport

37. *Option 2 sets out the proportion of vehicle trips travelling on the M25 (J26-27) link in the instance that the 8mppa is displaced to East Midlands Airport.*

38. *East Midlands Airport is located in Leicestershire, within 14 miles of Loughborough, Derby and Nottingham. In 2016, a total of 4.65 million passengers were recorded to travel through East Midlands Airport (CAA passenger survey, 2016). The maximum throughput of passengers is estimated at 10mppa (EMA Sustainable Development Plan, 2015), however, all 8 million trips have been assigned to the airport for this comparison exercise.*

39. *The routing of passengers to/from East Midlands Airport is presented in Figure 6.*

40. *Based on the passenger routings shown in Figure 6 and the assignment method previously adopted, the predicted number of passenger related vehicle trips attracted to the M25 (J26-27) link was derived. Table 6 illustrates the number of vehicles per scenario which are predicted to travel on the M25 (J26-27) link, according to place of residence.*

Table 6: Vehicle movements on M25 (J26-27) – East Midlands Airport

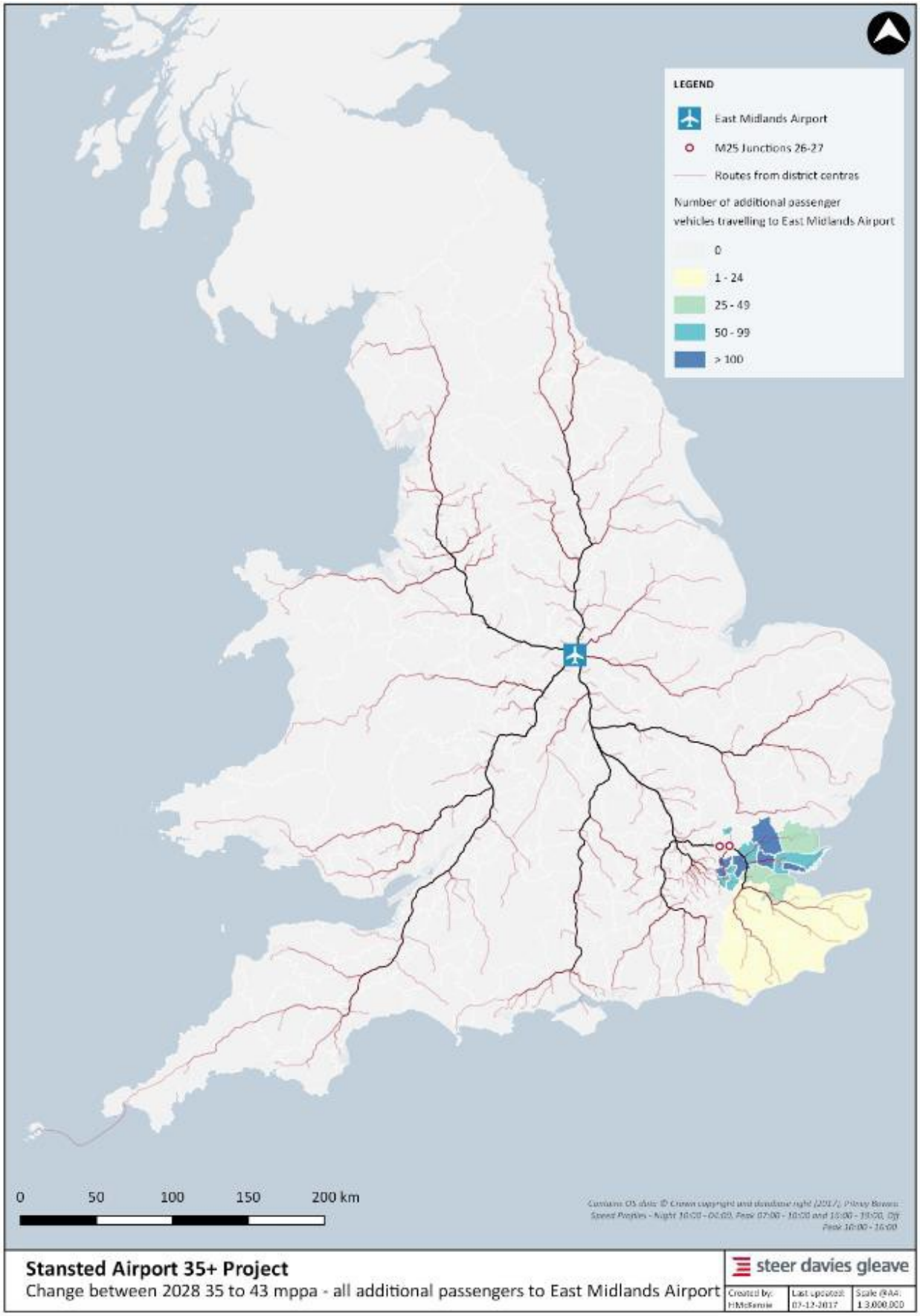
Aggregate Zone	Total additional Employee and Passenger trips to Stansted Airport 2028 43 (8mppa)	Displacement of additional Passenger trips to East Midlands Airport 2028-43 (8mppa)	Difference in M25 (J26-27) trips (+/-)
Rest of UK	0	0	0
East Midlands	13	0	-13
West Midlands	0	0	0
Southwest and Wales	179	0	-179
East Anglia	0	0	0
Outer South East NW	321	0	-321
Outer South East NE	550	684	+134
Outer South East SE	0	352	+352
Outer South East SW	146	0	-146
Inner London	0	74	+74
Outer London NE	0	516	+516
Outer London NW	285	0	-285
Outer London SE	0	52	+52
Outer London SW	0	0	0
Total	**1,493**	**1,677**	**+184**

41. *As Table 6 shows, a total of 1,677 passenger related vehicle trips would use the M25 (J26-27) link to travel to and from East Midlands Airport in the absence of the 35+ Project at Stansted Airport. This is 184 vehicle trips compared to the traffic forecast for passengers and employees combined, towards Stansted Airport for the 35+ project.*

42. *Passengers using the M25 (J26-27) are located in the 'Outer South East NE', 'Outer London NE' and 'Outer South East SE' zones. Figure 7 visually presents the origin/destinations of the displaced passengers to East Midlands Airport.*

Figure 6: Passenger Routing to East Midlands Airport

Figure 7: Proportion of Passengers using the M25 (J26-27) – East Midlands Airport



Option 3 – All Passengers displaced to Bristol Airport

43. *Bristol Airport is the UK's ninth largest airport, located in Lulsgate Bottom in North Somerset. In 2016, a total of 7.6 million passengers were recorded to travel through Bristol Airport (CAA passenger survey, 2016). The maximum throughput of passengers is estimated at 15mppa by 2030 (Bristol Airport 'Preparing for the Future', 2017).*

44. *The predicted trip assignment of vehicles for passengers to/from Bristol Airport is presented in Figure 8.*

45. *Based on the passenger routings shown in Figure 8 and the assignment method previously adopted, the predicted number of vehicle trips attracted to the M25 (J26-27) link was derived. Table 7 illustrates the number of vehicles per scenario which are predicted to travel on the M25 (J26-27) link, according to place of residence.*

Table 7: Vehicle movements on M25 (J26-27) – Bristol Airport

Aggregate Zone	Total additional Employee and Passenger trips to Stansted Airport 2028 43 (8mppa)	Displacement of additional Passenger trips to Bristol Airport 2028-43 (8mppa)	Difference in M25 (J26-27) trips (+/-)
Rest of UK	0	0	0
East Midlands	13	0	-13
West Midlands	0	0	0
Southwest and Wales	179	0	-179
East Anglia	0	305	+305
Outer South East NW	321	0	-321
Outer South East NE	550	1,090	+540
Outer South East SE	0	0	0
Outer South East SW	146	0	-146
Inner London	0	0	0
Outer London NE	0	121	+121
Outer London NW	285	0	-285
Outer London SE	0	0	0
Outer London SW	0	0	0
Total	**1,493**	**1,516**	**+23**

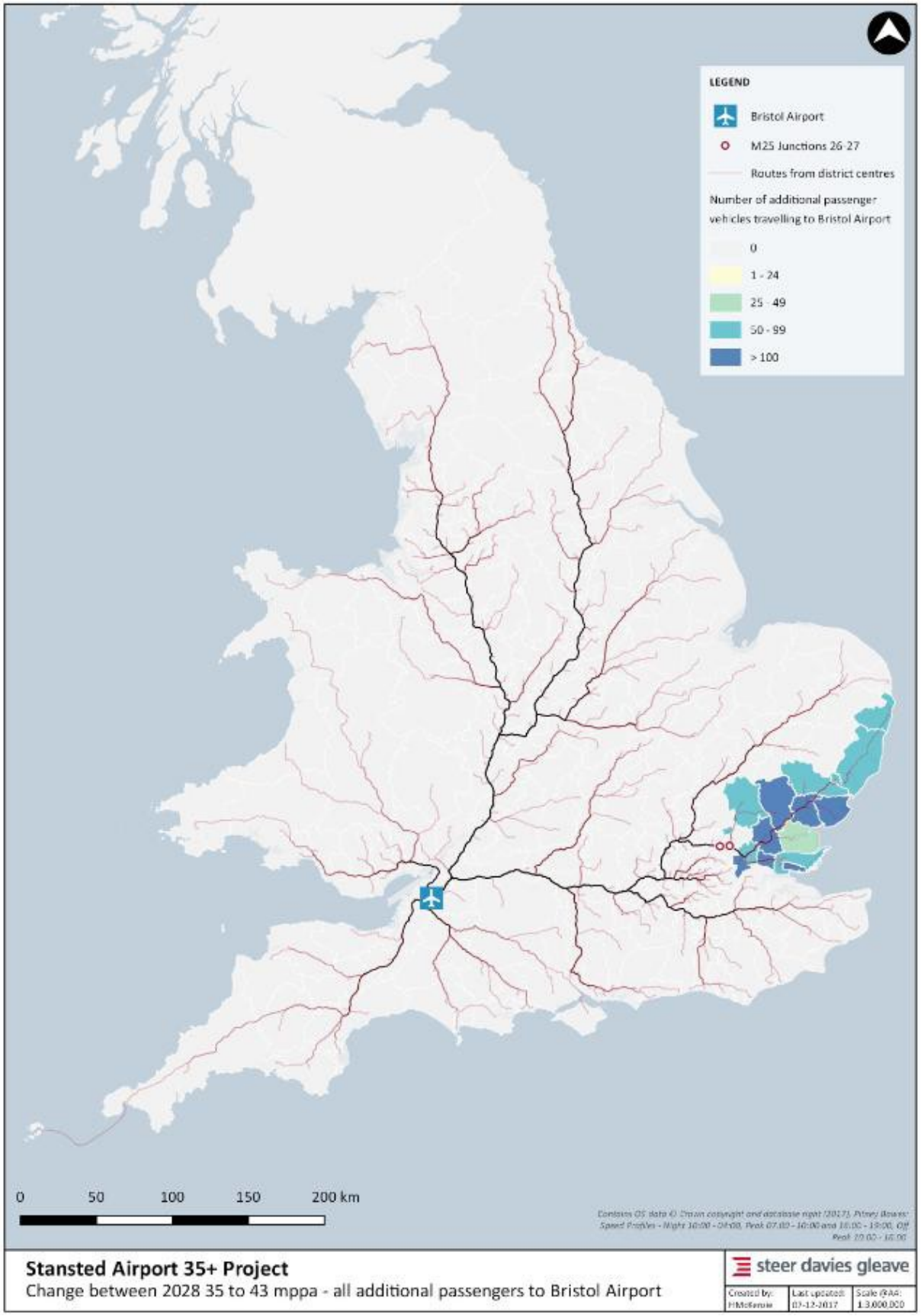
46. *As Table 7 shows, a total of 1,516 vehicle passenger related trips would use the M25 (J26-27) link to travel to Bristol Airport in the absence of the 35+ Project at Stansted Airport. This is 23 additional vehicle trips compared to the traffic forecast for passengers and employees combined, towards Stansted Airport for the 35+ Project.*

47. *Passengers using the M25 (J26-27) are located in 'East Anglia', the 'Outer South East NE' and 'Outer London NE' zones. Figure 9 visually presents the origin/destinations of the displaced passengers to Bristol Airport.*

Figure 8: Passenger Routing to Bristol Airport

48.

Figure 9: Proportion of Passengers using the M25 (J26-27) – Bristol Airport



Summary and Conclusions

50. *Stansted Airport 35+ Project is predicted to attract an additional 1,493 vehicular movements per day on the M25 (J26-27) link as a result of passenger and employee related travel.*

51. *In the absence of expansion of operations at Stansted, 8 million additional passenger trips will be diverted from Stansted to other UK airports.*

52. *The London market demand will be constrained from 2022/3 when the available airport capacities become limited in their operating capacities, and would therefore not be able to accommodate the 8mppa passenger demand. However, in accordance with DfT predictions, it is reasonable to anticipate that demand for air travel will remain and that alternative airports will attract these trips.*

53. *Results from the redistribution analysis for Birmingham Airport, East Midlands Airport and Bristol Airport all indicate between 1% and 12% more vehicular trips will use the M25 (J26-27) link if the Stansted 35+ Project does not go ahead, associated with a proportion of the passenger travel (8mppa). In practice, the alternative passenger trips could be anticipated to be shared amongst these and other smaller airports. This uplift in passengers is in comparison to the combined passenger and employee vehicle trips associated with the Stansted Airport 35+ application. It is considered that any future displaced employee travel to other airports would further increase the traffic growth on the M25 (J26-27) link.*

Background Traffic Comparison

54. *In all scenarios tested, there is an increase in vehicular traffic across the M25 (J26-27), however to understand the impact of growth compared to background traffic, 2016 existing traffic flow data was derived from the DfT at this point on the M25 as a baseline. 2016 data was used as this is the latest fully dataset provided. TEMPro was used to growth the background traffic for the assessment year: 2028. The background traffic growth is shown in Table 8, for the 1026 and 2028 scenarios, with and without traffic to Stansted Airport. The 2028 (35mppa) 'Do Minimum' scenario has been included as this has received planning consent.*

Table 8: Consented and Forecast Background Traffic Growth

Assessment Scenario	Volume of Traffic on M25 (J26-27)
2016 Baseline Traffic	135,453
2016 Background Traffic (No Airport)	131,033
2028 Background Traffic (No Airport)	154,422
2028 35mppa at Stansted Airport (consented)	160,943

55. *To understand the impact of the Stansted 35+ Project compared to the background flows presented in Table 8, the forecast additional 8mmpa trips to Stansted Airport and alternative airports: Birmingham, East Midlands and Bristol, were added and compared to the background flows, and a percentage change was calculated per airport to consider the proportional impact. The results are presented in Table 9.*

Table 9: Traffic Growth on M25 (J26-67) With/Without Stansted 35+ Project

Assessment Scenario	Volume of Traffic on M25 (J26-27)	% Growth
2028 43mppa at Stansted Airport	162,436	+0.93%
2028 43mppa (8mppa to Birmingham Airport)	162,451	+0.94%
2028 43mppa (8mppa to East Midlands Airport)	162,620	+1.04%
2028 43mppa (8mppa to Bristol Airport)	162,459	+0.94%

56. *The results of the analysis indicate that the 35+ Project at Stansted Airport will have the least impact on the total traffic flows for the M25 (J26-27) link of +0.93% growth in vehicular traffic compared to the displacement of passengers to alternative UK Airports which varies between +0.94 and +1.04% growth, if the consented 35mppa cap at Stansted Airport is retained. This additional growth represents passengers only compared to the combined passenger and employee demand at Stansted Airport. Potential future employee travel could further exacerbate the traffic flows on the M25 (J26-27) for other UK airports.*

Appendix 5 Epping Forest Ecology Survey Briefing Note

(RPS, June 2018)

RPS were commissioned by Stansted Airport Ltd. (STAL) to undertake vegetation surveys of the northern section of the Epping Forest Special Area of Conservation (SAC) in the vicinity of the nearest section of the M25 motorway to the designated site, namely Unit 105 of the site. The most recent condition assessment of the underlying Site of Special Scientific Interest (SSSI) noted that the unit in this location (Unit 105) was in Favourable condition, however:

"… notwithstanding this assessment, there remains a very significant issue relating to air quality and the related deposition of acidity and of nitrogen. Many veteran trees within the unit display clear symptoms of stress (eg thin canopy and die-back of leading shoots), there is excessive growth of bramble, and there are dense stands of nettles along roadsides and ride edges."

The aim of the survey was therefore to determine the habitats present (and specifically the features of interest for which the site is designated) within this unit, particularly within 200m of the M25. The locations of the veteran trees and other potentially vulnerable receptors (such as epiphytes) were mapped and notes made on whether these displayed evidence of such stress. A further aim was to determine the habitats present in relation to dominance by nitrophilous species that may result from eutrophication from nitrogen deposition.

Methodology and sampling strategy

Veteran trees

Four transects were walked aiming to cover as much ground within the northernmost 300m of the SAC adjacent to the M25 (see Survey Plan 1). Where possible, straight transect lines were adhered to; however, due to the nature of the site some areas were blocked by fallen trees and areas dominated by Holly *Ilex aquifolia*. In these cases the route was redirected. The location of veteran trees was mapped. While walking all transects, notes were made of any evidence of high nitrogen deposition were assessed by mapping areas of vigorous ruderal growth such as that of common nettle *Urtica dioica* and bramble *Rubus fruiticosus agg.*

Habitat community and species identification

The transects were used to map species composition and habitat community type, as well as the Common Standards Monitoring (CSM) indicators to assess the 'condition' of the woodland component of the SSSI. Therefore, the sampling strategy followed the NVC standard methodology but with less emphasis was on delimiting homogenous stands across the site.

The transect was based on the guidelines outlined in the Common Standards Monitoring Guidance for Woodlands Habitats (JNCC 2004). This method was chosen to account for small changes in species composition across the site and to better understand the potential drivers of such composition. Eleven 4x4m quadrats were paced out along the transect. Ground cover and canopy cover were both noted along with percentage cover of each species.

Results

Habitat type

No acid grassland or heathland habitats were recorded within the survey area.

Data collected within the quadrats are presented in Appendix 1. The habitat types present in this part of Epping Forest show an affinity with a mixture of W10 Quercus robur-Pteridum aquilinum-Rubus fruiticosus woodland and W14 Fagus sylvatica-Rubus Fruiticosus woodland. The second of these is characteristic of the Annex I woodland habitat Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) that is a primary reason for selection of Epping Forest as an SAC. Mature woodland is across the survey area including directly adjacent to the roads

Data collected within the quadrats are presented in Appendix 1. The habitat types present in this part of Epping Forest show an affinity with a mixture of W10 *Quercus robur-Pteridum aquilinum-Rubus fruiticosus* woodland and W14 *Fagus sylvatica-Rubus Fruiticosus* woodland. The second of these is characteristic of the Annex I woodland habitat *Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*)* that is a primary reason for selection of Epping Forest as an SAC. Mature woodland is across the survey area including directly adjacent to the roads.

Habitat description

The habitat across the majority of the site is largely homogenous being of varying levels of maturity of mainly beech, oak, hornbeam and holly. The ground cover is mostly bare, with occasional hornbeam saplings establishing. One clearing was dominated by bracken (Quadrat 8).The woodland rides and edges are notably different to the rest of the woodland being dominated by oak and ruderal species such as nettle and bramble. There are however other herbaceous woodland species found along these open areas not seen within the woodland such as yellow pimpernel, lords-and-ladies and enchanter's nightshade. .

In particular, north of the SAC boundary adjacent to the cricket pitch over the Bell Common Tunnel, the woodland is dominated by oak nd to a lesser degree hornbeam with infrequent immature beech, distinctly different from the woodland habitat present within the SAC. The understorey in this area was particularly dominated by bramble and nettle.

Areas of dense bramble and nettle occurred in areas dominated by oak outside and along the boundary of the SAC both close to and some distance from roads (see Q9-Q11) but were absent from the beech-dominated interior of the woodland.

Table A3.2: Quadrats taken along transect and species composition.

Quadrant		Species	Common Name	Percentage Cover
Q1	**Ground**	*N/A*		
	Canopy	*Illex aquifolium*	Holly	100%
		Quercus robur	Common Oak	80%
Q2	**Ground**	*Carpinus betulus*	Hornbeam	10%
		Illex aquifolium	Holly	1%

		Moss (To be ID'd)		10%
	Canopy	*Illex aquifolium*	Holly	100%
		Carpinous betulus	Hornbeam	100%
Q3	**Ground**	*Oxalis acetosella*	Wood Sorell	1%
		Moss (T B I)		40%
		Carpinus betulus	Hornbeam	1%
	Canopy	*Quercus robur*	Common Oak	1%
		Illex aquifolium	Holly	60%
		Carpinous betulus	Hornbeam	40%
Q4	**Ground**	*N/A*		
	Canopy	*Illex aquifolium*	Holly	80%
		Fagus sylvatica	Beech	40%
Q5	**Ground**	*Carpinous betulus*	Hornbeam	10%
		Moss (TBI)		1%
	Canopy	*Illex aquifolium*	Holly	80%
		Quercus Robur	Common Oak	60%
		Fagus sylvatica	Beech	40%
Q6	**Ground**	*Moss (TBI)*		30%
	Canopy	*Fagus sylvatica*	Beech	100%
Q7	**Ground**	*N/A*		
	Canopy	*Carpinous betulus*	Hawnbeam	40%
		Acer pseudoplantanus	Sycamore	50%
		Sorbus aucuparia	Rowan	40%
		Fagus sylvatica	Beech	20%
Q8	**Ground**	*Pteridium aquilinum*	Bracken	40%
	Canopy	*Carpinus betulus*	Hornbeam	10%
Q9	**Ground**	*Alleria petiolate*	Garlic Mustard	40%
		Rubus fruiticosus	Bramble	60%
		Geum urbanum	Wood avens	10%

	Canopy	*Quercus cerris*	Turkey Oak	40%
		Sorbus aucuparia	Rowan	40%
Q10	**Ground**	*Rubus fruiticosus*	Bramble	90%
	Canopy	*Quercus robur*	Common Oak	20%
		Betula pubescence	Downy Birch	30%
Q11	**Ground**	*Cardamine flexuosa*	Wavey Bitter-Cress	10%
		Circaea lutetiana	Enchanters Nightshade	10%
		Geum urbanum	Wood avens	10%
		Urtica diocia	Stinging Nettle	30%
		Rubus fruiticosus	Bramble	20%
		Silene dioca	Red Campion	10%
		Chamerion angustifolium	Great Willowherb	10%
		Gallium aparine	Cleavers	10%
	Canopy	*Quercus robur*	Common Oak	30%

Other species noted around the site not included within the quadrats include: red-veined dock *Rumex sanguinus,* rhododendron *Rhododendron ponticum,* herb-robert *Geranium robertianum,* lord's-and-ladies *Arum maculatum,* hawthorn *Cretagous monogyna,* cherry laurel *Prunus laurocerasus* and yellow pimpernel *Lysimachia nemorum*.

Distribution of veteran trees

No veteran trees occurred within 200 m of the Bell Common Tunnel eastern portal nor within 100 m of the western portal (Figure 3).

Veteran trees were inspected from ground level for epiphytic lichen and bryophytes, species were identified, and percentage cover of the tree estimated. Coverage was low in all trees, most trees supported only one lichen (*Lepraria incana*), excluding one where no lichen was recorded. Where present, bryophytes were also limited to a single species (*Aulacomnium androgynum*). The only exception was tree 3, where an addition 2 lichen and 3 bryophyte species were present, although these were recorded on a large piece of fallen deadwood, rather than the standing tree.

Table A3.3 SSM survey results for veteran trees

Tree no.	Publicly visible	Species	Girth (m)	Form	Standing	Deadwood	Holes	Hollows	Fallen deadwood	Damage	Animal signs	Lichen cover	Bryophyte cover
1	No	Beech	3.6	Maiden	Upright	None	Present	Absent	Present	Tear	None	<1%	1%
2	No	Oak	4.5	Maiden	Upright	Large branch	Present	Absent	Present	Tear	None	<1%	0%
3	Yes	Beech	5.0	Maiden	Upright	None	Absent	Absent	Absent	Tear	None	<1%	<1%
4	No	Beech	3.8	Maiden	Upright	Standing	Present	Absent	Present	Tear	None	1%	0%
5	Yes	Oak	4.7	Maiden	Upright	None	Absent	Absent	Present	None	None	1%	0%
6	No	Hornbeam	3.5	Maiden	Upright	None	Present	Absent	Present	None	None	<1%	<1%
7	No	Beech	5.2	Maiden	Upright	None	Present	Absent	Absent	None	None	<1%	1%
8	No	Beech	4.1	Maiden	Upright	None	Present	Absent	Present	Tear	Deer in vicinity	10%	5%
9	No	Beech	3.9	Maiden	Upright	Some	Absent	Absent	Absent	Tear	None	<1%	<1%
10	No	Beech	3.5	Maiden	Upright	Some	Absent	Absent	Present	None	None	1%	0%
11	Yes	Beech	4.8	Maiden/ pollard	Upright	None	Present	Present	Absent	None	None	<1%	<1%
12	No	Beech	4.2	Maiden	Leaning	Some	Absent	Absent	Present	Tear, scars	None	<1%	1%
13	No	Beech	4.2	Maiden	Upright	Multiple	Present	Absent	Absent	Tears	None	<1%	<1%

						branches							
14	No	Beech	4.2	Maiden	Upright	Multiple large branches	Present	Absent	Present	Tear	Deer in vicinity	<1%	1%
15	No	Oak	4.7	Maiden	Upright	None	Absent	Absent	Absent	None	None	<1%	<1%
16	No	Oak	5.0	Maiden	Upright	Some	Absent	Absent	Present	None	None	0%	0%
17	Yes	Oak	4.6	Maiden	Upright	Some	Absent	Absent	Present	Fallen branch	None	10%	1%

Condition of trees and epiphyte cover

In general, the mature/veteran beech trees across the survey were in reasonable condition with some trees displaying extensive damage by leaf-mining invertebrates. Oak was most frequent towards the edges of the SAC and along the rides. As described by Natural England, many of these displayed evidence of stress including abundant epicormic growth and branch die-back. It is not possible from observational evidence to determine the cause of this stress, although nutrient imbalance due to nitrogen enrichment may be a contributory factor.

Epiphyte number and diversity were low across the entire study area with 1.43% on average (<10% everywhere and most trees had <1% lichen cover and similarly low bryophyte cover). There was no clear trend between % lichen cover and distance from the M25 (see Figure A3.1).

LIS

The survey was limited to oak trees due to the low occurrence of birch in the woodland. Locations along five transect lines were chosen and suitable trees surveyed for LIS, the locations were evenly spaced where the presence of oak allowed. Trunk data was recorded for all trees, the LIS score for all 6 locations was 0, as no indicator species were present. Branch data was only recorded for those close to the edge of the forest (location 1 & 6), in all other locations branches within sight of the ground were absent, although *Punctelia subrudecta* was found on fallen bark and branches underneath the trees so likely present higher in the canopy.

Table A3.4 Lichen indicator score for locations where branches were visible from the ground.

Location 1 <50m from M25							
	Tree 1	Tree 2	Tree 3	Tree 4	Tree 5		
Aspect	W S E	W S E	W S E	W S E	W S E	Count	Average
N-sensitive	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0	0
N-tolerant	0 0 2	0 1 2	1 1 1	0 0 0	0 0 0	9	1.8
LIS indicator score = -1.8; NAQI = 1.3							
Location 6 within 200m of M25							
	Tree 1	Tree 2	Tree 3	Tree 4	Tree 5		
Aspect	W S E	W S E	W S E	W S E	W S E	Count	Average
N-sensitive	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0	0
N-tolerant	1 1 1	0 0 1	0 1 0	0 1 1	0 0 0	7	1.4
LIS indicator score = -1.4; NAQI = 1.2							

SAC within 200 m of the M25

Table 1 below describes the area of the SAC within the buffer zones around the two Bell Common Tunnel portals (Survey Plan 2). Only 0.27% of the total SAC area occurs with 200 m of the portals [note a separate calculation of area of SAC within 200m of the M25 as a whole is still to be calculated – as a very small area of the SAC to the west of the portal falls into the category].

Table 1: Areas of the Epping Forest SAC within 200 m of the M25 portals

Distance from tunnel portal of M25	Area of SAC within buffer	% of total area of SAC	Number of veteran within buffer
20m buffer	0.01ha	0.0006%	0
50m buffer	0.19ha	0.01%	0
100m buffer	0.99ha	0.06%	0
150 m buffer	2.65ha	0.17%	3
200m buffer	5.53ha	0.34%	8
Total area of SAC 1,604.95ha			

Photographs of Epping Forest

Photograph 1: Epping Forest beech pollards

Photograph 2: Epping Forest beech pollards with holly understorey

Photograph 3: Evidence of localised nutrient enrichment along path edge due to dogs

Photograph 4: Oak-dominated woodland to north of SAC with bramble/nettle ground flora

Photograph 5: Epicormic growth on oak

Photograph 6 – M25 west-bound

Appendix 6 Air Quality Modelling Technical Note

ARUP

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Project title	Stansted Airport 35+ Planning Application (UTT/18/0460/FUL)	Job number	253360-00
cc	STAL / RPS	File reference	AQ/TN/005
Prepared by	Arup	Date	15 June 2018
Subject	Impact of 35+ Planning Application on Epping Forest Special Area of Conservation (SAC)		

Natural England has raised the impact of the 35+ Planning Application on ecological receptors in Epping Forest Special Area of Conservation (SAC) as a potential concern. We have undertaken an investigation into the potential impact on nutrient nitrogen deposition in the SAC in 2028, using forecast traffic data from Steer Davies Gleave (SDG).

The data used as input to the modelling is given in Appendix A1. The results are presented in section 1 and conclusions are in section 2.

1 Nutrient Nitrogen Deposition Results

Table 1 presents the predicted concentrations and nutrient nitrogen deposition at receptors in Epping Forest SAC due to the road traffic on the M25 between junction 26 and 27 in 2028, and the road traffic plus background, without the 35+ Planning Application. The background concentrations are assumed to include the impact of all relevant emission sources and the six road links nearest to the ecological receptors in Epping Forest have been modelled explicitly to capture the maximum impact of the predicted change in traffic. Results are presented with the following ADMS-Roads model options: complex terrain, variable surface roughness, noise barriers and tunnel portals. Meteorological data from Stansted Airport for 2016 has been used. Section A1.11 discusses sensitivity of the results to the model options and section A1.12 discusses the sensitivity to meteorological data.

Table 2 presents the predicted increase in NOx concentrations and nutrient nitrogen deposition in 2028 at the receptors due to the 35+ Planning Application. The change is given in terms of deposition rate (kgN/ha/yr) and the change in deposition rate as a function of the minimum critical load. The maximum predicted change in deposition rate is 0.17% of the minimum critical load of 10kgN/ha/yr.

Figure 1 and Figure 2 present the predicted deposition rate as contour plots: due to traffic on the M25 without the 35+ Planning Application (Figure 1) and the predicted change due to the 35+ Planning Application (Figure 2). It can be observed that the deposition rate decreases rapidly with distance from the road.

Table 1: 2026 without 35+ Planning Application: NOx concentration (µg/m^3) and nutrient nitrogen deposition (kgN/ha/yr), road contribution and total (road plus background)

ID	Easting	Northing	NOx concentration (µg/m^3)		Nutrient nitrogen deposition rate (kgN/ha/yr)	
			Road contribution	Road + background	Road contribution	Road + background
a	544591	201032	10.3	36.9	1.45	28.33
b	544570	201016	10.7	37.4	1.51	28.39
c	544548	200999	8.0	34.7	1.13	28.01
d	544525	200981	5.8	32.5	0.83	27.71
e	544499	200962	4.2	30.8	0.60	27.48
f	544471	200941	3.0	29.6	0.43	27.31
g	544611	201017	5.2	31.8	0.74	27.62
h	544635	201000	3.0	29.7	0.43	27.31
i	544662	200993	2.0	28.7	0.29	27.17
j	544696	200984	1.4	28.1	0.20	27.08
k	544762	200988	0.9	27.6	0.14	27.02
l	544801	200990	0.8	27.5	0.12	27.00
m	544837	200989	0.8	27.5	0.12	27.00
n	544878	200987	0.8	27.5	0.12	27.00
o	544918	200978	1.0	27.7	0.15	27.03
p	544944	200967	1.3	28.0	0.19	27.07
q	544938	200942	1.3	28.0	0.20	27.08
r	544933	200917	1.3	28.0	0.19	27.07

Table 2: 2028 35+ Planning Application: change in NOx concentration (µg/m^3) nutrient nitrogen deposition (kgN/ha/yr)

ID	Change in NOx concentration due to 35+ (µg/m^3)	Change in deposition rate due to 35+ (kgN/ha/yr)	Total deposition rate with 35+ (kgN/ha/yr)	Change as a percentage of the lower critical load (%)
a	0.11	0.02	28.35	0.17
b	0.12	0.02	28.41	0.17
c	0.09	0.01	28.03	0.12
d	0.06	0.01	27.72	0.09
e	0.05	0.01	27.48	0.06
f	0.03	<0.01	27.31	0.03
g	0.06	0.01	27.63	0.09
h	0.03	0.01	27.32	0.06
i	0.02	<0.01	27.18	0.03
j	0.02	<0.01	27.09	0.03
k	0.01	<0.01	27.02	<0.01
l	0.01	<0.01	27.00	0.03
m	0.01	<0.01	27.00	0.03
n	0.01	<0.01	27.00	<0.01
o	0.01	<0.01	27.03	0.03
p	0.01	<0.01	27.08	0.03
q	0.01	<0.01	27.08	<0.01
r	0.01	<0.01	27.07	<0.01

1 Conclusions

The impact of the 35+ Planning Application on traffic on the M25 between junctions 26 and 27 is predicted to be zero in 2023 and 1,493 AADT (2-way) in 2028. The impact of this change in traffic on receptors in Epping Forest SAC has been calculated. The maximum increase in nutrient nitrogen deposition is predicted to be 0.02kgN/ha/yr, which corresponds to 0.17% of the minimum critical load. Levels of deposition drop off rapidly away from the road.

Changes of less than 1% of a critical level or critical load can be assumed to be insignificant, an approach used consistently by Highways England, Natural England, the Environment Agency and the Institute of Air Quality Management[1]. The effect of the 35+ Planning Application on nutrient nitrogen deposition in this area is therefore **not significant**.

[1]Highways England Interim Advice Note 174/13, Updated advice for evaluating significant local air quality effects for users of DMRB 11, Section 3, Part 1. Annex A, A.2.

Figure 1: Nutrient nitrogen deposition (kgN/ha/yr) without the 35+ Planning Application change in traffic (road + background) within 200m of the portal centreline

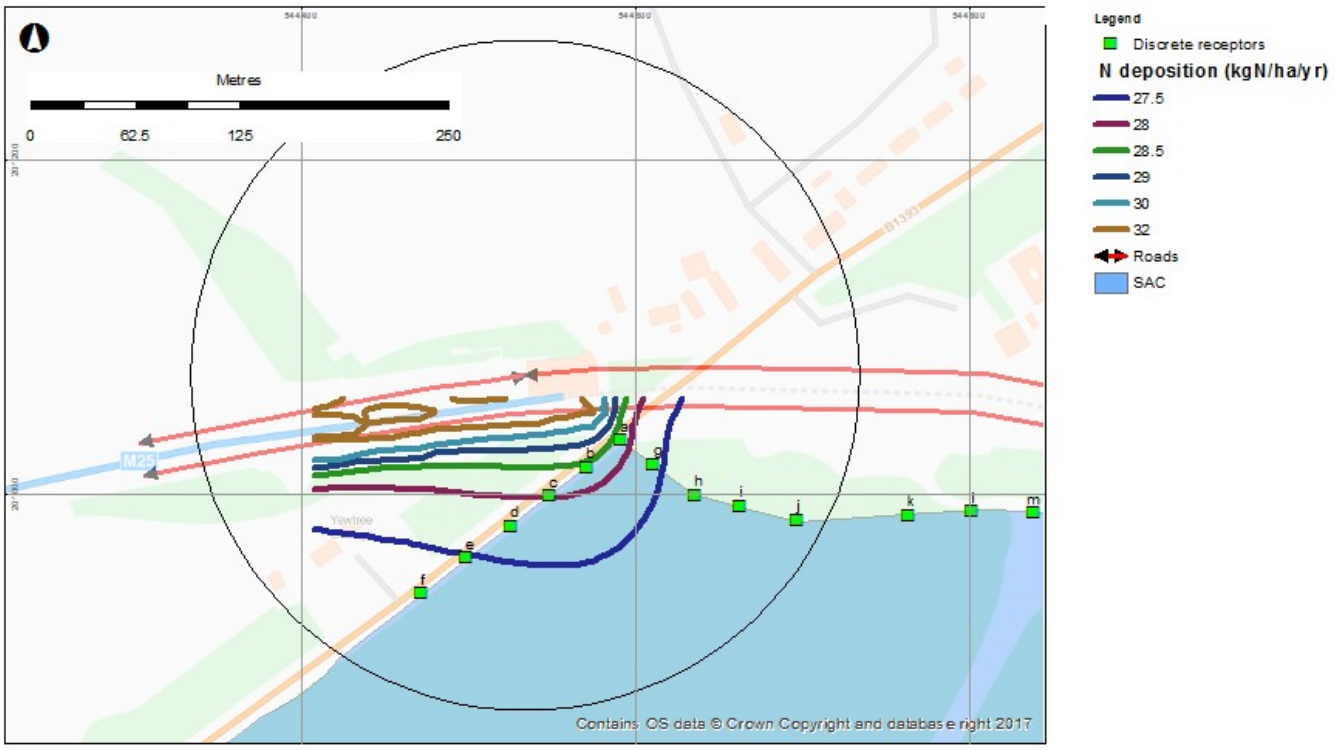
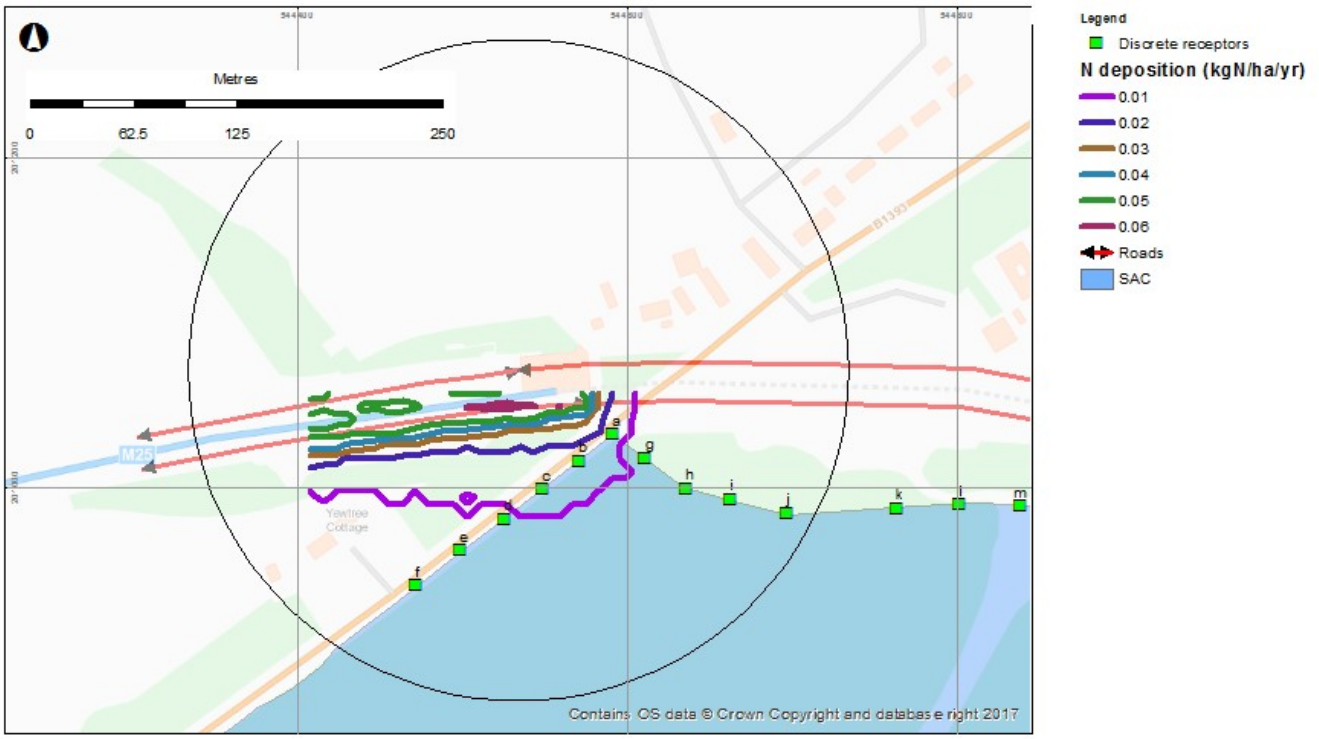


Figure 2: Nutrient nitrogen deposition (kgN/ha/yr), change due to the 35+ Planning Application change in traffic within 200m of the portal centreline



A1 Model Input Data

A1.1 Traffic Data

2016 data on the links near the SAC between junctions 26 and 27 of the M25 were obtained from the Department for Transport's (DfT's) webtris website[2]. The annual average daily traffic (AADT) data for each link is given in Table 3 and the links are shown in Figure 3. A width of 15m was assumed for each road link and a speed of 96kph (60mph). Emissions were calculated using the latest Emission Factor Toolkit (EFT) from Defra, version 8.0.1[3].

SDG supplied forecasts of the projected growth in baseline traffic between 2016 and 2028 (Tempro), and the impact of the currently consented capacity (35mppa) and the 35+ Planning application (43mppa). The ratio between the 2028 AADT without 35+ and the 2016 total without 35+ is 1.20. The AADT flows in Table 3 were therefore multiplied by 1.20 to give the link-specific AADT flows in 2028 (Table 4).

The predicted change in traffic due to the 35+ Planning application is 1,493, which exceeds one of the criteria set by Highways England in the Design Manual for Roads and Bridges (DMRB)[4] for defining *"whether there are likely to be significant impacts associated with particular broadly defined routes or corridors"*. The criterion is that there is a change of 1,000 AADT in daily traffic flow.

Table 3: 2016 AADT data for modelled road links, from DfT webtris website

Site	Name	AADT
10363	5570_EB	68,405
10362	5570_WB	68,355
10527	5573_EB	71,138
10527	5573_WB	71,138
10444	5576_EB	68,444
10538	5576_WB	67,807
Note: At DfT Count ID 28049 the HGVs are 14.3% of total vehicles. This percentage of HGVs was assumed to be the same for all road links.		

Table 4: 2-way AADT between M25 junctions 26 and 27, supplied by SDG

ID	Scenario	AADT		
		2016	2023	2028
A	Baseline	137,155	137,155	137,155
B	Tempro	0	15,066	26,830
C	Change due to 35 mppa	4,845	6,522	6,522
D	Total without 35+	142,000	158,743	170,507
E	Change due to 35+	0	0	1,493*
Note: *The percentage of HDVs was assumed to be 2%				

[2] Webtris http://webtris.highwaysengland.co.uk/ [Accessed June 2018]
[3] https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed June 2018]
[4] HA207/07 Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, May 2007, paragraph 3.12

A1.2 Dispersion Model

The dispersion model ADMS-Roads version 4.0.1.0 was used. It allows the ADMS-Roads options of road traffic, tunnel portals and noise barriers to be modelled with hills (complex terrain).

No model verification was carried out due to the high level nature of this assessment and the lack of suitable monitoring data. However, the verification described in the ES for receptors near to motorways concluded that no adjustment factor was required. Therefore, there is a high degree of confidence that the modelling results provide an accurate prediction of pollutant concentrations close to the modelled links.

A1.3 Receptors

Figure 3 shows the discrete receptors at which nutrient nitrogen deposition was calculated (receptors a to r) and the extent of the gridded output (green rectangle) used to plot contours. Results were also calculated at receptors at a 2m resolution along a 200m transect starting at the western tunnel exit. Figure 4 shows the location of the receptors with respect to the ends of each road link.

Figure 3: Road links (blue), discrete receptors (green) and Epping Forest SAC (grey)

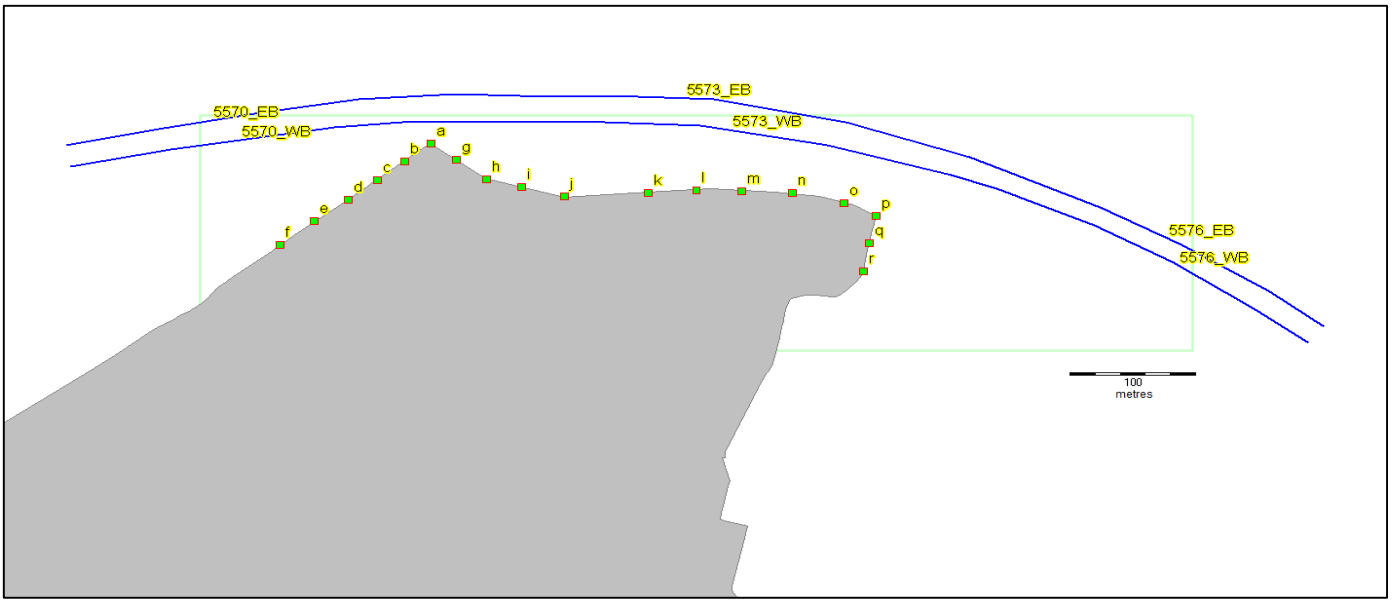
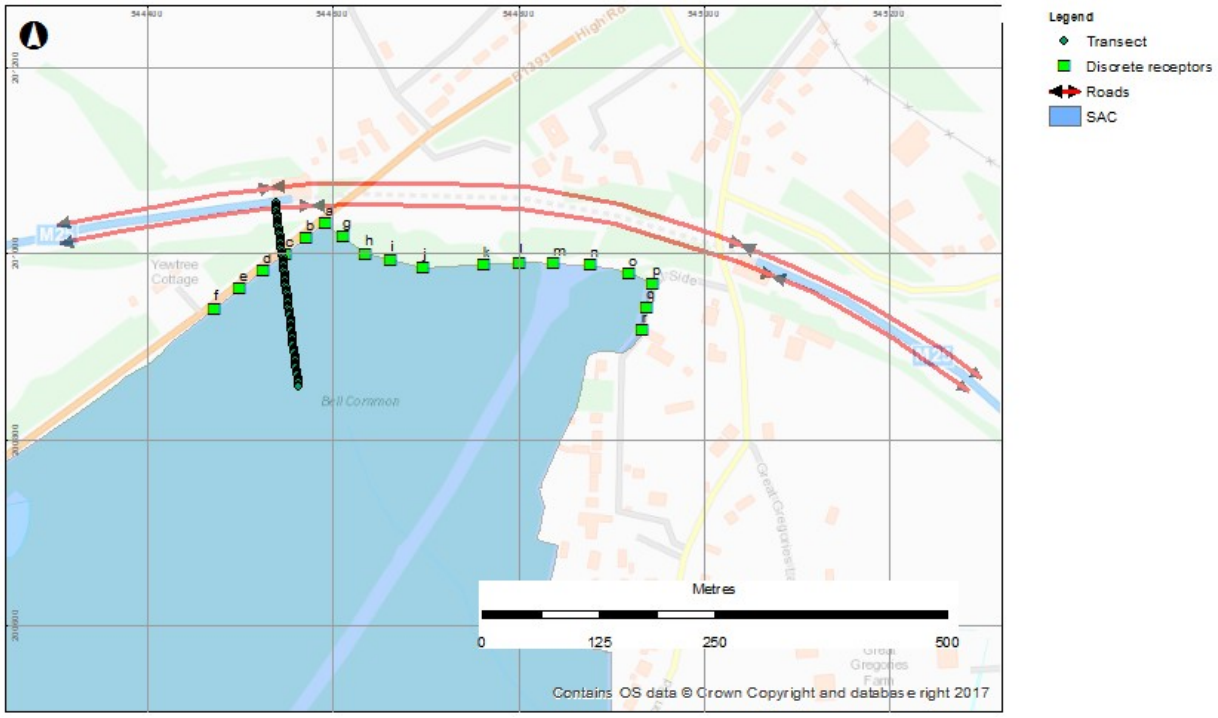


Figure 4: Road links, discrete receptors and transect

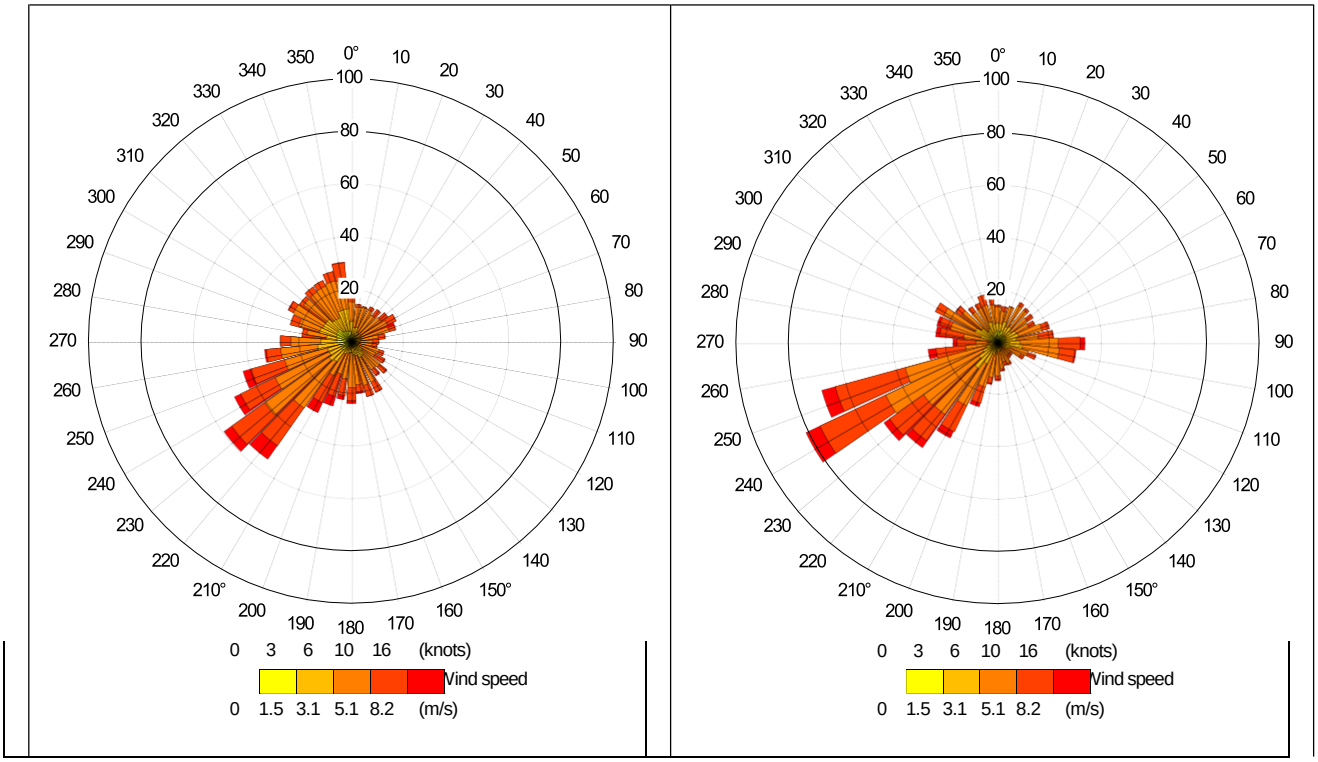


A1.4 Meteorological Data

Figure 5 presents the windrose of the meteorological data used, from Stansted Airport, 2016. The prevailing wind directions are south-westerly. Data from London City Airport, also shown in Figure 5, has been used to test the sensitivity of the results to the choice of meteorological data station.

A surface roughness of 0.2m was used at the meteorological site and 1.0m at the dispersion site. A minimum Monin-Obukhov length of 10m was used at the meteorological site and 30m at the dispersion site.

Figure 5: Stansted Airport 2016 windrose (left); London City Airport 2016 windrose (right)



A1.5 Terrain and Variable Surface Roughness

Terrain data was obtained from the Environment Agency 2m resolution LIDAR data[5]. In order to achieve a large enough domain of terrain data to enable contour plots over a sufficient extent, and yet retain the high resolution features and meet the limit on file size (66,000 points of data), a terrain file was created with 7m resolution. Figure 7 shows the terrain data used.

To represent the greater surface roughness in the forest compared with the fields to the north of the forest, a variable surface roughness file was created covering the same domain as the terrain data. A value of 1.0m was used to represent surface roughness in the forest and 0.3m to represent the fields to the north of the forest[6].

[5] https://data.gov.uk/dataset/002d24f0-0056-4176-b55e-171ba7f0e0d5/lidar-composite-dtm-2m Supplied by RPS, June 2018

[6] ADMS-Roads version 4.0 User Guide, Table 3.9

The details of the flow and dispersion through the forest has not been modelled as it is beyond the capability of the ADMS-Roads model, and indeed may not be well handled even by a computational fluid dynamics (CFD) model, a more complex and computationally intensive numerical model. However, as the maximum impact will be at the trees closest to the modelled road links, the details of flow further from the road links will not affect the conclusions.

A1.6 Noise Barrier

The solid fence at the top of the cutting was modelled as a noise barrier along either side of the road links emerging from the eastern and western portals: road link 5570 (5570_EB, 5570_WB) and 5576 (5576_EB, 5576_WB) for all of their lengths.

In the flat terrain scenario a noise barrier 12m in height above the road surface and 15m from the centreline of each road link was modelled using the ADMS-Roads additional input file, Noise barriers option. In the model runs with terrain the height of the noise barrier was specified as 2m, corresponding to the height at the top of the fence above the local terrain.

A1.7 Tunnel Portal

The tunnel portals were modelled using the following parameters:

- Bore depth: 6m
- Portal Base Elevation: 10m
- Outflow width: 15m
- Outflow Wall: yes

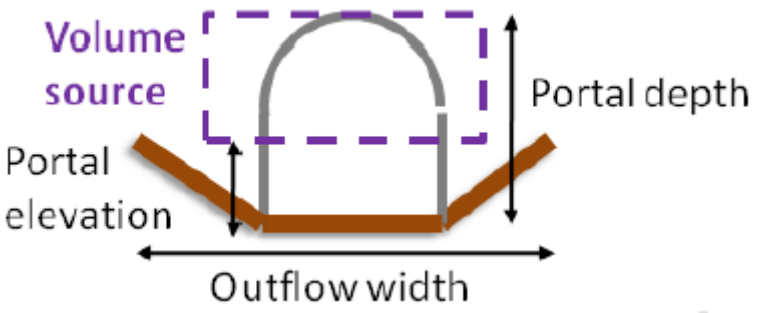


Figure 6: Taken from the ADMS-Roads User Guide

The portals were modelled using the ADMS-Roads additional input file, Road tunnels option.

A1.8 Critical Load, Background Deposition Rate and Background Concentration

The nutrient nitrogen critical load for three of the interest features of the SAC[7] (Atlantic acidophilous beech forests with Ilex, Northern Atlantic wet heaths with Erica tetralix, and European dry heaths) is **10-20kgN/ha/yr**. The fourth interest feature, stag beetle, is not sensitive to nitrogen.

The background concentration of NOx at the assessed receptors[7] is 22.66µg/m^3 at receptors a and b, and 25.05µg/m^3 at the remaining receptors. These background concentrations are below the critical level and air quality objective for ecological receptors of 30µg/m^3. However, the critical level does not apply to locations more than 20km from towns with more than 250,000 inhabitants, or more than

[7] Air Pollution Information System (APIS) http://www.apis.ac.uk/srcl/select-a-feature?site=UK0012720&SiteType=SAC&submit=Next accessed June 2018

5km from other built-up areas, industrial installations or motorways[8]. This air quality objective does not therefore apply at the assessed receptors.

The background nutrient nitrogen deposition rate at the receptors[7] assessed is **26.88kg/ha/yr**, which is above both the minimum and maximum critical loads for the site.

A1.9 Calculation of NO_2 Concentration

The dispersion model predicts NOx concentrations which comprise nitric oxide (NO) and nitrogen dioxide (NO_2). The deposition rate of NO is negligible and therefore the amount of NO_2 at each receptor was calculated.

The Local Air Quality Management Technical Guidance (LAQM.TG16)[9] details an approach for calculating the roadside conversion of NOx to NO_2. This approach takes into account the NOx generated by the road traffic, ambient NOx and/or NO_2, the concentration of ozone and the different proportions of primary NO_2 emissions in different years. This approach is available as a spreadsheet calculator, and the most up-to-date version, version 6.1[10], has been used.

The background NO_2 concentration for 2016 has been obtained from Defra's 1km^2 resolution background maps[11]. The values are 18.88µg/m^3 at receptors a and b, and 17.23µg/m^3 at the remaining receptors. The highest value of 18.88µg/m^3 was used in the NOx to NO_2 converter for all receptors as a conservative assumption.

A1.10 Calculation of Nutrient Nitrogen Deposition

The predicted NO_2 concentrations were multiplied by a deposition velocity of 0.003m/s, the value recommended by the Environment Agency for deposition of NO_2 to forest[12], to give the deposition rate of NO_2 in µg/m^2/s. The deposition rate values in µg/m^2/s were then multiplied by 96 to convert to units of kgN/ha/yr, which are the units of the nutrient nitrogen deposition critical load.

A1.11 Sensitivity of Results to Complex Model Options

The options used in the modelling (terrain, noise barrier, road tunnel) are advanced model options and validation of the options alone or in combination is limited. A sensitivity analysis was undertaken to assess the importance of these advanced options in determining the magnitude of the final result. Table 5 shows the predicted deposition flux at the specified receptors. The results show the expected, physically reasonable, trends:

- Use of the tunnel option reduced concentrations at receptors close to the road links in the tunnel (5573_EB and 5573_WB), receptors a and g-r, and increases it at receptors close to the tunnel portal, receptors b to f; and

[8] 2010 No.100, Environmental Protection, The Air Quality Standards Regulations 2010, 11 June 2010
[9] Defra (2016) Local Air Quality Management Technical Guidance.TG16
[10] Defra NOx to NO2 calculator (version 6.1), https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc [Accessed: June 2018].
[11] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html [Accessed June 2018]
[12] AQTAG 06 "Technical Guidance on Detailed Modelling Approach for an Appropriate Assessment for Emissions to Air, 20/04/10

- Use of the noise barrier options reduces concentrations at receptors close to the noise barrier (in this case that is all the receptors).

In addition:

- Use of terrain with the complex options of noise barrier and tunnel portal generally increased the maximum concentration;
- Use of variable surface roughness as well as terrain reduced the maximum concentration slightly and increased the minimum concentrations slightly.

The difference between the minimum value at receptor a and the maximum value is 55%. The concentration and deposition results presented in the sections 1 and 2 are therefore those for case:

- Complex terrain + variable surface roughness + tunnel + noise barrier (Stansted meteorological data).

A1.12 Sensitivity of Results to Meteorological Data Station

To test the sensitivity of model results to the choice of meteorological data station, a comparison has been made between NOx concentrations calculated using data from Stansted Airport and from London City Airport (City) for 2016. The results are shown in Table 5.

Use of data meteorological data from London City Airport reduced the maximum concentration and increased the minimum concentrations. Stansted Airport meteorological data has therefore been used to generate the results presented in sections 1 and 2 as it is judged to be the more representative of the modelled area. London City Airport is on the Thames estuary where more easterly winds are recorded (Figure 5) than would be expected at the study area.

Technical Note

253360-00 15 June 2018

Figure 7: Terrain data used

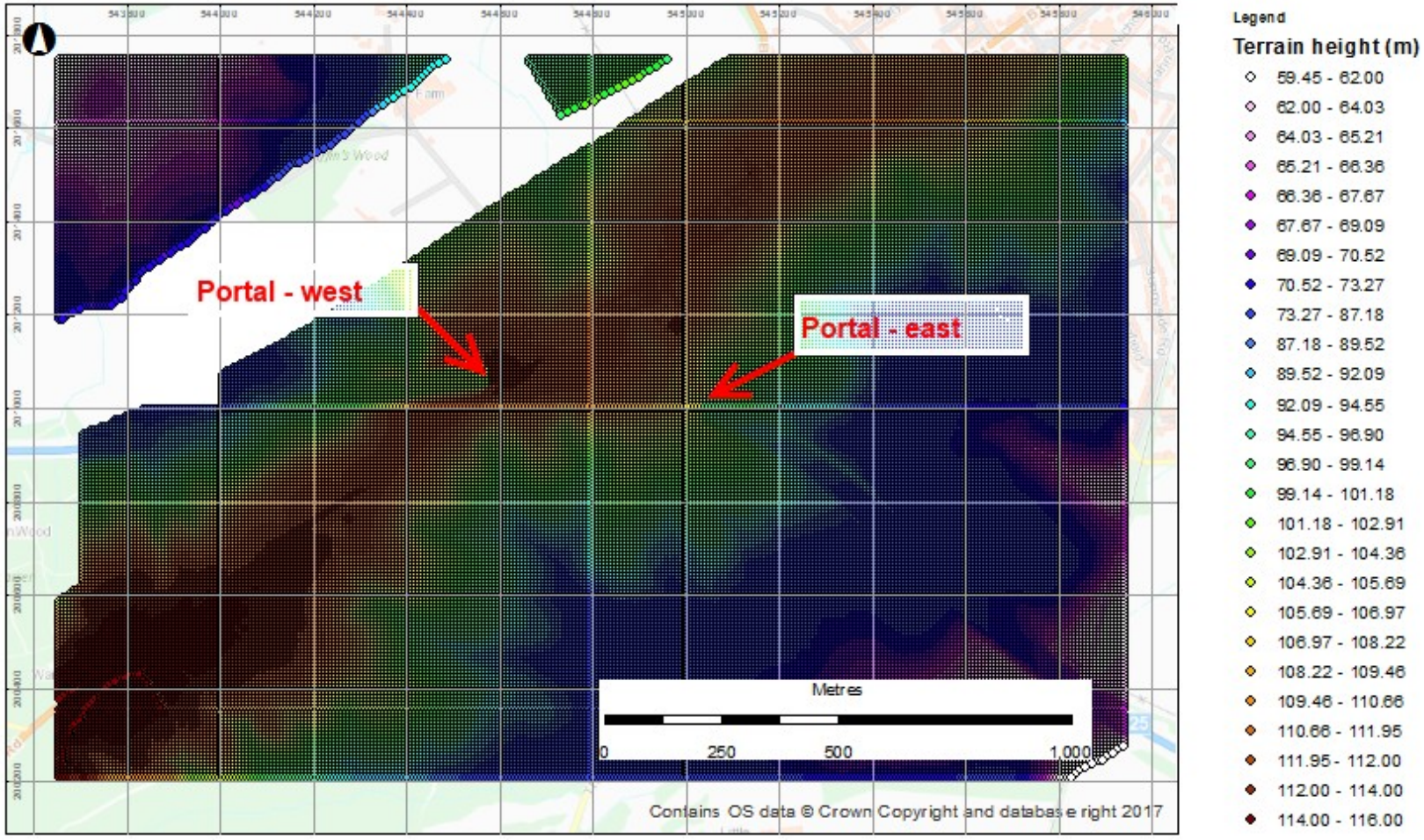
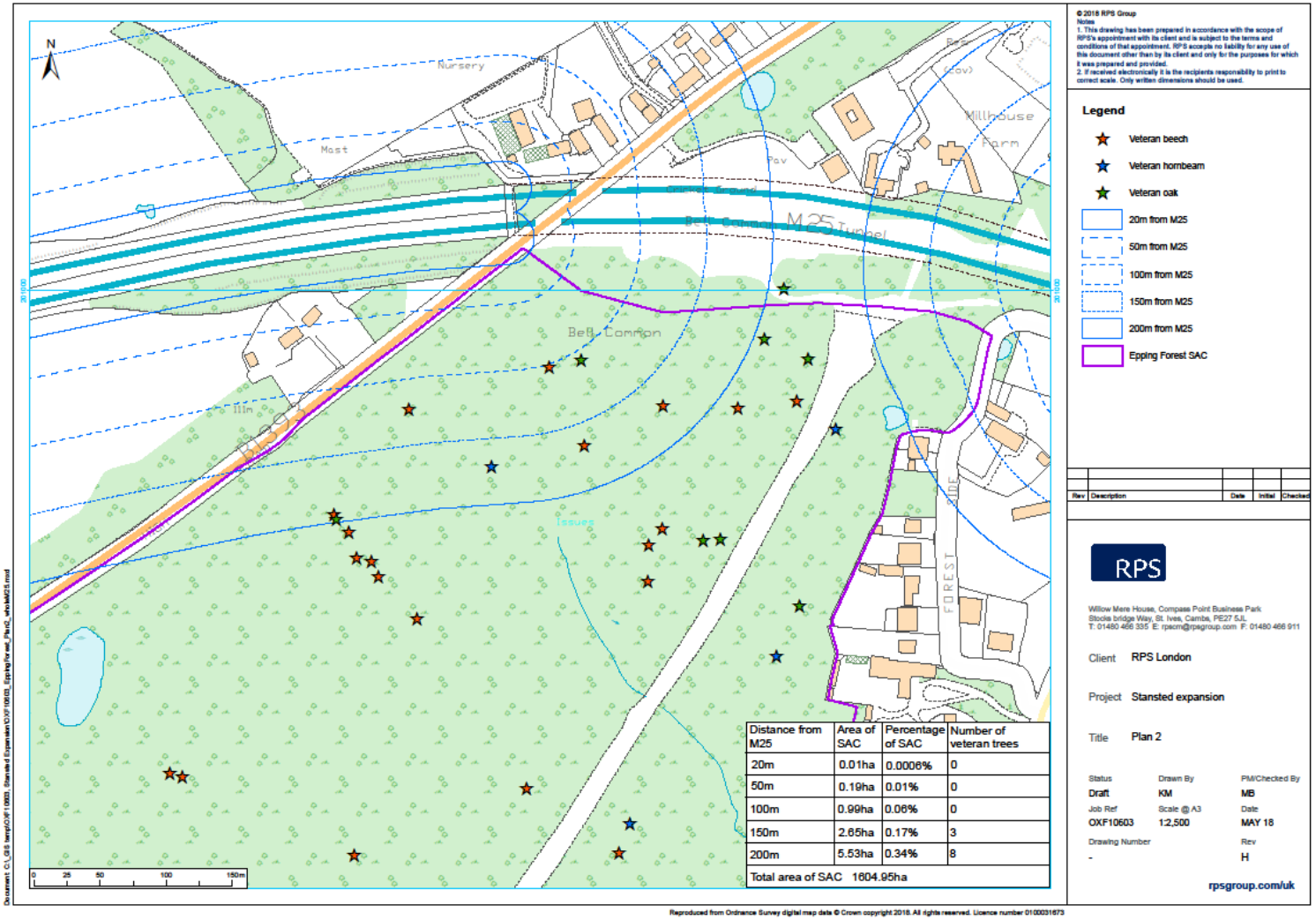


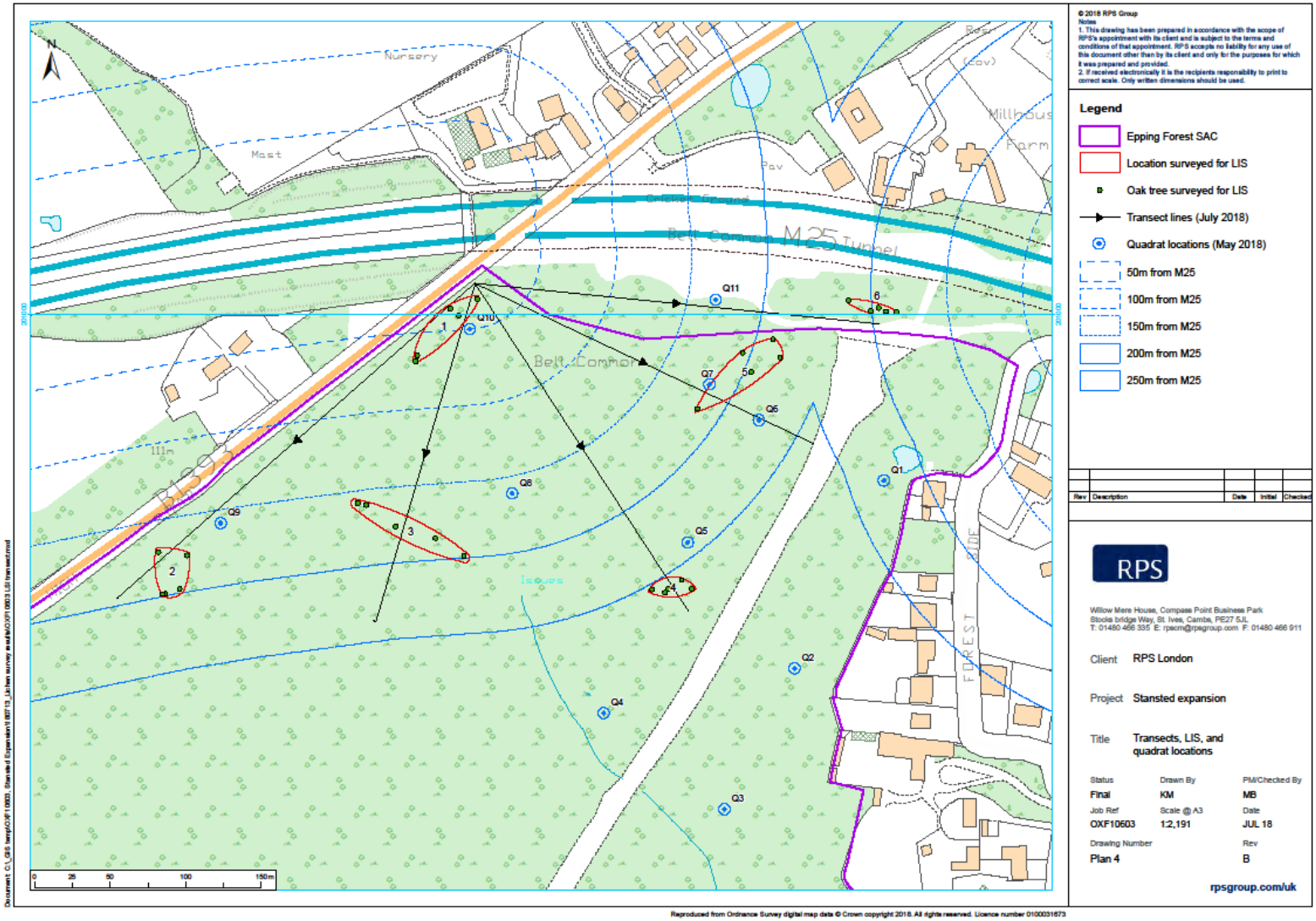
Table 5: Nutrient nitrogen deposition at specified receptors (kg/ha/yr) using different advanced model options

ID	Easting	Northing	Flat terrain				Complex terrain					
			None	Tunnel	Noise barrier	Tunnel + Noise barrier	None	Tunnel	Noise barrier	Tunnel + Noise barrier	Variable roughness + Tunnel + Noise barrier	Variable roughness + Tunnel + Noise barrier**
a	544591	201032	11.8	10.1	9.3	7.6	11.3	10.3	10.6	10.7	10.3	8.2
b	544570	201016	7.4	5.9	9.5	7.9	6.7	5.8	10.8	10.9	10.7	8.0
c	544548	200999	5.4	4.4	7.5	6.6	5.4	4.5	8.6	8.5	8.0	6.3
d	544525	200981	4.1	3.5	5.8	5.2	4.3	3.5	6.3	6.1	5.8	4.8
e	544499	200962	3.3	2.8	4.4	3.9	3.3	2.8	4.4	4.3	4.2	3.6
f	544471	200941	2.6	2.3	3.3	3.0	2.3	2.1	2.9	2.9	3.0	2.7
g	544611	201017	7.6	7.1	5.2	4.7	7.3	7.0	5.2	5.2	5.2	4.2
h	544635	201000	5.3	5.1	3.2	3.0	4.9	4.8	3.0	3.0	3.0	2.6
i	544662	200993	4.8	4.7	2.3	2.2	4.4	4.4	2.0	2.1	2.0	1.9
j	544696	200984	4.3	4.2	1.7	1.6	4.0	4.0	1.4	1.4	1.4	1.4
k	544762	200988	4.6	4.6	1.2	1.1	4.6	4.5	0.9	0.9	0.9	1.1
l	544801	200990	4.9	4.9	1.0	1.0	5.0	5.0	0.8	0.8	0.8	1.0
m	544837	200989	5.2	5.2	1.0	0.9	5.2	5.2	0.8	0.8	0.8	1.1
n	544878	200987	5.7	5.7	1.0	1.0	5.4	5.4	0.8	0.8	0.8	1.3
o	544918	200978	5.7	5.7	1.2	1.1	5.2	5.2	1.0	1.0	1.0	1.6
p	544944	200967	5.3	5.2	1.4	1.4	4.7	4.7	1.2	1.2	1.3	2.0
q	544938	200942	3.7	3.7	1.3	1.3	3.3	3.3	1.2	1.2	1.3	1.9
r	544933	200917	2.8	2.8	1.2	1.2	2.6	2.6	1.2	1.2	1.3	1.7

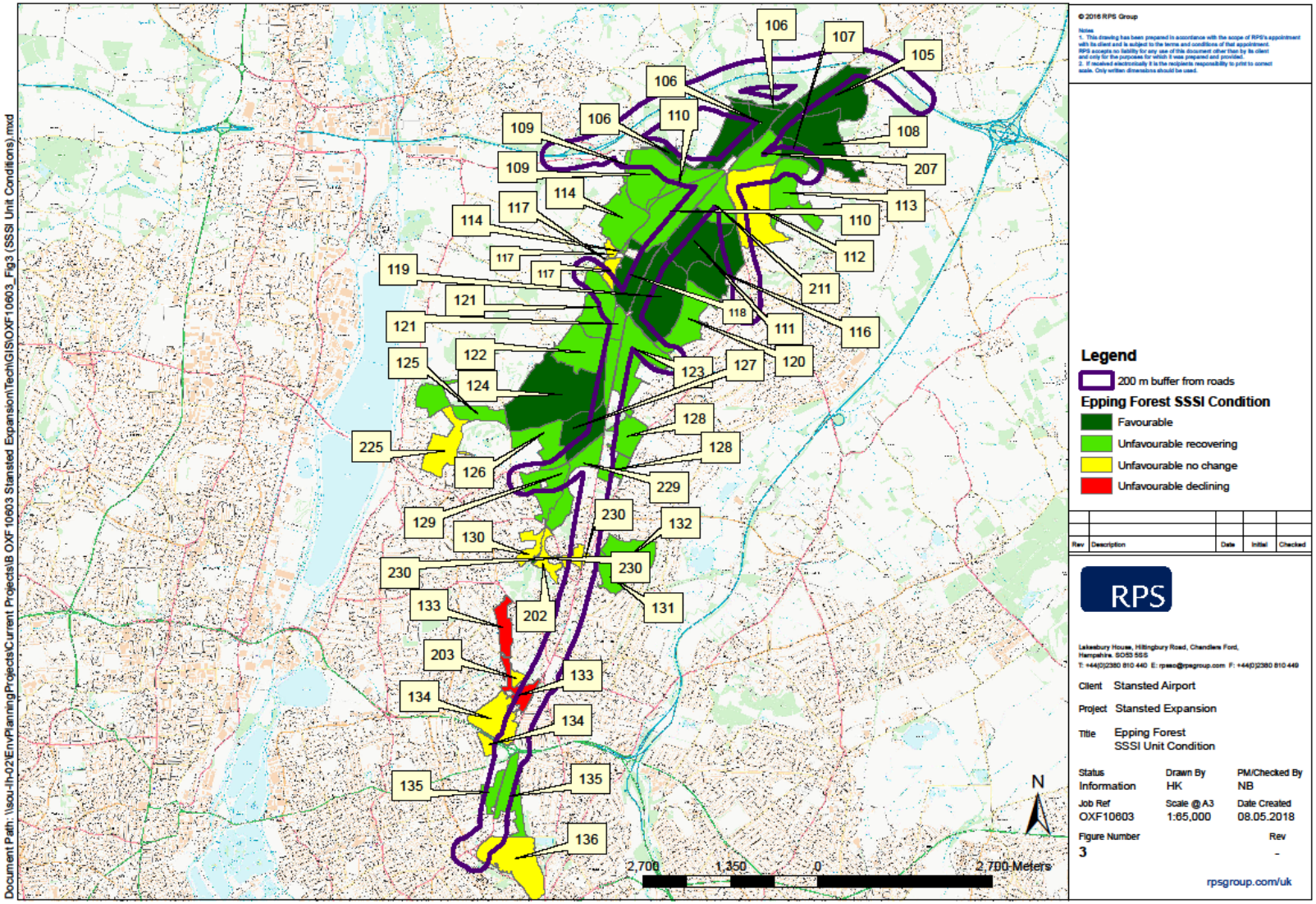
Appendix 7 SSSI Unit 105 Plan – Veteran Trees



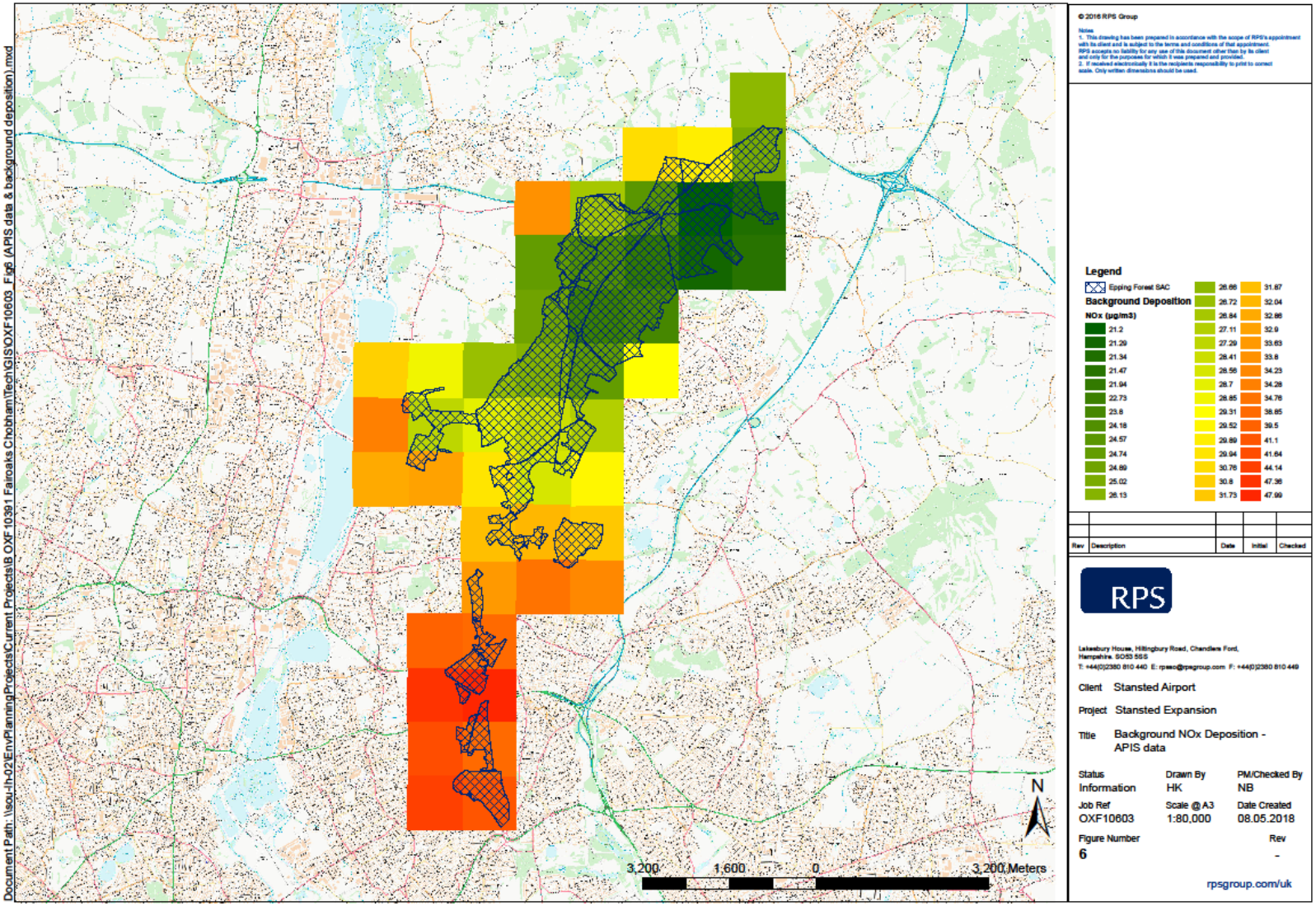
Appendix 8: SSSI Unit 105 -Transects, LIS and Quadrat Locations



Appendix 9 SSSI Unit Condition



Appendix 10: APIS data - background NOx deposition



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