Mid Sussex District Council

Impact of Mid Sussex District Council Plan Traffic at Ashdown Forest

Air Quality Assessment

Final 1 | 3 October 2017

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It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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This assessment of nitrogen deposition has been prepared by Ove Arup and Partners Ltd (Arup) on behalf of Mid Sussex District Council (MSDC).

Development in MSDC is predicted to affect road traffic on roads through Ashdown Forest in neighbouring Wealdon District Council (WDC). Ashdown Forest is designated as a Site of Special Scientific Interest (SSSI) and most of the Forest is also designated as a Special Protection Area (SPA) and Special Area of Conservation (SAC).

The current scheme for the District Plan has identified and agreed provisionally with the Inspector an interim scenario which involves the delivery of 876 dwellings per annum (p/a) until 2023/24. The impact of the planned development on traffic is to increase traffic on the A275, but to reduce traffic on the A22, A26 and B2110.

Current background nitrogen deposition levels exceed the minimum and maximum critical loads for the Broad-leaved, mixed yew and woodland, whereas for Dry heaths and Northern wet heath, the minimum critical load is exceeded but the maximum is not.

It is found that there would be an overall reduction is the mass of nitrogen deposited in Ashdown Forest and that all the changes in deposition rate are less than 1% of the (minimum) critical load and are therefore insignificant.

1 Introduction

This air quality assessment has been prepared by Ove Arup and Partners Ltd (Arup) on behalf of Mid Sussex District Council (MSDC). It assesses the potential effect of changes in road traffic due to the MSDC proposed Plan, on nutrient nitrogen deposition at ecological receptors in Ashdown Forest. The Forest is designated as a Site of Special Scientific Interest (SSSI) and most of it is also designated a Special Protection Area (SPA) and Special Area of Conservation (SAC).

1.1 Scope of Assessment

Proposed development in MSDC is predicted to affect road traffic on roads through Ashdown Forest in neighbouring Wealdon District Council (WDC). The impact of traffic emissions to air and the subsequent deposition of nutrient nitrogen which can harm the sensitive habitats in the forest, has been the subject of several court rulings. High levels of NO_x can adversely affect vegetation, including leaf or needle damage and reduce plant growth. Deposition of pollutants derived from NOx emissions contribute to acidification and/or eutrophication of sensitive habitats leading to loss of biodiversity.

The current scheme for the District Plan has identified and agreed provisionally with the Inspector an interim scenario which involves the delivery of 876 dwellings per annum (p/a) until 2023/24. The impact of the planned development on traffic is to increase traffic on the A275, but to reduce traffic on the A22, A26 and B2110.

This assessment focuses on the change in emissions of NO_x from traffic on the four key roads and the consequent change in nutrient nitrogen deposition. The report describes the legislative and guidance context, the methodology used, baseline conditions, predicted impacts and likely significant effects. The methodology used is the usual methodology for planning applications. Detailed dispersion modelling has been undertaken using the ADMS-Roads version 4 atmospheric dispersion model.

2 Policy Context

2.1 Air Quality Legislation and Guidance

2.1.1 European Air Quality Management

In 1996 the European Commission published the Air Quality Framework Directive on ambient air quality assessment and management (96/62/EC)[1]. This Directive defined the policy framework for 12 air pollutants known to have harmful effects on human health and the protection of vegetation. Limit values (pollutant concentrations not to be exceeded by a certain date) for each specified pollutant were set through a series of Daughter Directives, including Directive 1999/30/EC (the 1st Daughter Directive)[2] which sets limit values for sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and oxides of nitrogen (NOx), particulate matter (PM_{10}) and lead in ambient air.

In May 2008 the Directive 2008/50/EC[3] on ambient air quality and cleaner air for Europe came into force. This Directive consolidates the above (apart from the 4th Daughter Directive) and makes provision for extended compliance deadlines for NO_2 and PM_{10}. The Directive has been transposed into national legislation in England by the Air Quality Standards Regulations 2010[4]. The Secretary of State for the Environment has the duty of ensuring compliance with the air quality limit values.

2.1.2 Ecological Legislation

European Council Directive 92/43/EEC[5] (Habitats Directive) requires member states to introduce a range of measures for the protection of habitats and species. The Conservation of Habitats and Species Regulations 2010[6] transposes the Directive into law in England and Wales.

The Habitats Directive requires the competent authority first to evaluate whether the Proposed Scheme is likely to give rise to a significant effect on the European site (Habitats Regulation Assessment screening). Where this is the case, it has to carry out an ‘appropriate assessment’ in order to determine whether the Project would adversely affect the integrity of the European site.

There are critical loads for habitats which are defined as: "*a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present*

[1] Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management
[2] Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
[3] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[4] The Air Quality Standards Regulations 2010, SI 2010/1001
[5] European Council Directive (92/43/EEC) of 21 May 1992, on the conservation of natural habitats and of wild fauna and flora
[6] UK The Conservation of Habitats and Species Regulations (2010) No. 490

knowledge". The critical loads used in this assessment are those for nutrient nitrogen deposition.

The critical loads are set as ranges, reflecting the uncertainty in the present scientific knowledge and evidence-base on the effects of air pollution on sensitive species. If the upper limit critical load (CLmax) is exceeded, it is likely that there is harm to the relevant habitat/features arising from the current level of nitrogen deposition. If the deposition level is below the lower limit critical load (CLmin), it is unlikely that the feature/habitat is being harmed. If the deposition level lies between the lower and upper critical load values, it is not possible to be certain that harmful effects are, or are not, occurring.

The relevant critical loads for this study have been derived from the most up-to-date information on the APIS website[7] and are shown in Table 1.

Table 1: Nutrient nitrogen critical loads (kg N/ha/yr)

Critical load class	**Feature**	**Nitrogen critical loads CLmin-CLmax (kg N/ha/yr)**
Broad-leaved, mixed and yew woodland	Alnus glutinosa - Carex paniculata woodland	10 - 20
	Alnus glutinosa - Urtica dioica woodland	
Dry heaths	Dwarf shrub heath (Calluna vulgaris - Ulex minor heath)	10 - 20
Northern wet heath: Erica tetralix dominated wet heath	Dwarf shrub heath (Erica tetralix - Sphagnum compactum wet heath)	10 - 20
None available	Invertebrate assemblage	None available
None available	Outstanding dragonfly assemblage	None available

[7] APIS (Air Pollution Information System) www.apis.ac.uk, accessed June 2017

2.2 Planning Policy and Guidance

2.2.1 National Planning Policy Framework

The National Planning Policy Framework[8] (NPPF) was published in March 2012 with the purpose of planning to achieve sustainable development. Paragraph 124 of the NPPF on air quality states that:

"*Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."*

In addition, paragraph 120 states that:

"*To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area of proposed development to adverse effects from pollution, should be taken into account."*

2.3 Local Planning Policy

2.3.1 Wealden District Council Adopted Core Strategy

Wealdon District Council (WDC) published the adopted core strategy in 2013[9]. This document contains no policies relevant specifically relating to air quality, however, policy SP01 relates to protecting the environment:

"We will help manage countryside resources and assist in the development of the rural economy whilst protecting and enhancing recognised biodiversity and geodiversity attributes, in particular we will protect the internationally important sites of the Pevensey Levels and Ashdown Forest and other designated areas of bio and geodiversity. We will also protect, and will work with others to enhance and manage, the distinct landscapes of the District, particularly, but not exclusively, those nationally designated."

[8] Department for Communities and Local Government (2012) National Planning Policy Framework
[9] Wealden District Council (2016) Core Strategy Local Plan [accessed September 2017].

2.4 Other Policy and Guidance

2.4.1 Local Air Quality Management Policy Guidance and Technical Guidance

The LAQM.PG16[10] provides guidance on the links between air quality and the land-use planning system. The guidance advises that air quality considerations should be integrated in the planning process at the earliest stage and is intended to aid local authorities in developing action plans to deal with specific air quality problems and create strategies to improve air quality generally. It summarises the main ways in which the land use planning system can help deliver compliance with the air quality objectives. LAQM.TG16[11] provides the technical guidance for carrying out air quality assessments which has been followed in this assessment.

2.4.2 Defra/Environment Agency Guidance for Permitting

Defra and the Environment Agency (EA) publish guidance[12] for permitting of industrial sources which includes a method for assessing the significance of impacts on ecological receptors. Although the guidance is for permitting of industrial sources rather than plan-making, it is nonetheless the most relevant guidance available. It states:

> **"When there are SPAs, SACs, Ramsar sites and SSSIs within the specified distance:**
>
> If your emissions that affect SPAs, SACs, Ramsar sites or SSSIs meet both of the following criteria, they're insignificant - you don't need to assess them any further:
>
> 1. the short-term PC is less than 10% of the short-term environmental standard for protected conservation areas
> 2. the long-term PC is less than 1% of the long-term environmental standard for protected conservation areas
>
> If you don't meet these requirements you need to calculate the PEC and check the PEC against the standard for protected conservation areas.
>
> You don't need to calculate PEC for short-term targets.
>
> If your short-term PC exceeds the screening criteria, you need to do detailed modelling.

[10] Defra, Local Air Quality Management Policy Guidance (2016) LAQM.PG16
[11] Defra, Local Air Quality Management Technical Guidance (2016) - http://laqm.defra.gov.uk/technical-guidance/ [accessed June 2016] LAQM.TG16
[12] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#environmental-standards-for-air-emissions

If your long-term PC is greater than 1% and your PEC is less than 70% of the long-term environmental standard, the emissions are insignificant – you don't need to assess them any further.

If your PEC is greater than 70% of the long-term environmental standard, you need to do detailed modelling."

3 Assessment Methodology

3.1 Assessment Methodology

The overall approach to the air quality assessment comprises:

- A review of the existing air quality and nitrogen deposition across the study area;
- Verification of the road traffic model using local monitoring data;
- An assessment of the potential changes in NO_2 concentrations and the nitrogen deposition arising from forecast changes to traffic flows with the MSDC proposed Plan; and
- Determination of the significance of the effects.

3.2 Methodology for Assessment of Baseline Conditions

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

The following data sources have been used to determine the baseline and future conditions of air quality in the study area:

- WDC[13] & MSDC[14] assessment reports and local air quality monitoring data; and
- The Defra Local Air Quality Management website[15].

A desk-based review was undertaken using the data sources described above. The review identified local air quality monitoring data for recent years and local background pollutant concentrations.

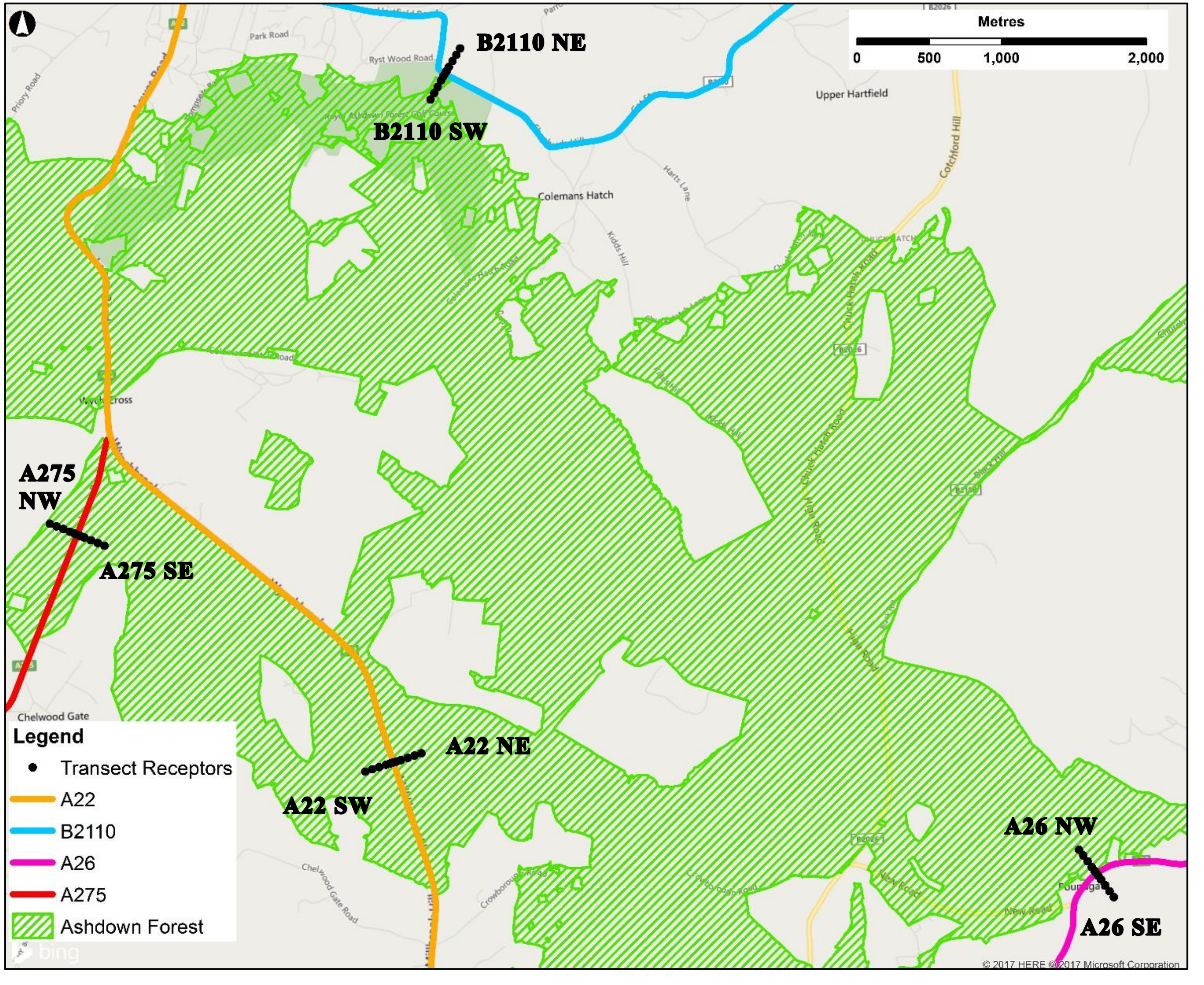
3.3 Methodology for Assessment of Effects from Operation

3.3.1 Study Area

The study area for the assessment of traffic impacts has been defined by identifying the major roads which run through Ashdown Forest and for which traffic data has been supplied. The roads which make up the study area are the A22, A275, A26 and B2110. The study area is shown in Figure 1.

[13] Wealden District Council (2016) Annual Status report [accessed September 2017]
[14] Mid Sussex District Council (2017) Annual Status Report [accessed September 2017]
[15] Defra Local Air Quality Management website, http://laqm.defra.gov.uk [accessed June 2016]

Figure 1: Study area, modelled roads and transect receptors



3.3.2 Assessment Scenarios

The assessment scenarios are summarised as follows:

- 2014 baseline scenario;
- 2031 Do-Minimum (DM) scenario; and
- 2031 Do-Something (DS) scenario.

3.3.3 Traffic Data

Traffic data was provided to the air quality team by the transport consultants for the proposed Plan, Amey. The traffic data provided included 24-hour Annual Average Daily Traffic (AADT) flows. Information on the percentage of heavy goods vehicles (HGVs) was not provided and was estimated based on traffic count data from count sites located to the north and south of Ashdown Forest[16]: Count point ID 8450 (A22 north of the study area, road segment south-east of East Grinstead); and Count point ID 73477 (A272 south of study area, road segment south-east of Scaynes Hill).

The speeds allocated to each link were based on the speed limit for that road link taken from the ITO World website[17] and by identifying visible speed limit signs on Google Maps street view. Traffic speeds were reduced at junctions and roundabouts to 20kph as recommended in LAQM.TG16. The traffic data used including the assumed speeds and percentages of HGVs is given in Appendix A.

Emission rates have been calculated using the Defra Emissions Factor Toolkit (EFT) v7[18] and the modelled road network is shown in Figure 1.

3.3.4 Sensitive Receptors

Two types of receptors have been modelled for this assessment: a grid of receptors through Ashdown Forest; and transect receptors for each modelled road. The grid of receptors were at a spacing of 100m across Ashdown Forest, located at a height of 0m.

Transect receptors were included at a single location for the A22, A275, A26 and B2110 (four sets in total). The transect receptors were at distances of 5, 10, 20, 50, 100, 150 and 200m from the edge of the road, at a height of 0m. The transect receptors are shown in Figure 1 and were listed in Table 2.

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[16] DFT https://www.dft.gov.uk/traffic-counts/cp.php?la=West+Sussex, using a site
[17] ITO http://product.itoworld.com/map/124. [Accessed September 2017]
[18] Defra Emission Factor Toolkit v7 (http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html) [Accessed September 2017]

Table 2: Transect receptors

ID[1]	Nearest road	Distance from road (m)	NGR[2] (m)	
			X	Y
A275-se-5m	A275	5	541761	131123
A275-se-10m	A275	10	541765	131121
A275-se-20m	A275	20	541775	131118
A275-se-50m	A275	50	541802	131106
A275-se-100m	A275	100	541849	131088
A275-se-150m	A275	150	541895	131069
A275-se-200m	A275	200	541942	131050
A275-nw-5m	A275	5	541745	131129
A275-nw-10m	A275	10	541741	131131
A275-nw-20m	A275	20	541731	131135
A275-nw-50m	A275	50	541704	131146
A275-nw-100m	A275	100	541657	131165
A275-nw-150m	A275	150	541611	131183
A275-nw-200m	A275	200	541565	131202
A22-sw-5m	A22	5	543929	129552
A22-sw-10m	A22	10	543924	129551
A22-sw-20m	A22	20	543915	129548
A22-sw-50m	A22	50	543886	129538
A22-sw-100m	A22	100	543839	129523
A22-sw-150m	A22	150	543791	129508
A22-sw-200m	A22	200	543744	129492
A22-ne-5m	A22	5	543945	129557
A22-ne-10m	A22	10	543950	129559
A22-ne-20m	A22	20	543959	129562
A22-ne-50m	A22	50	543988	129571
A22-ne-100m	A22	100	544035	129587
A22-ne-150m	A22	150	544083	129602
A22-ne-200m	A22	200	544130	129618
A26-nw-5m	A26	5	548786	128796
A26-nw-10m	A26	10	548783	128800
A26-nw-20m	A26	20	548777	128808

ID[1]	Nearest road	Distance from road (m)	NGR[2] (m)	
			X	Y
A26-nw-50m	A26	50	548759	128833
A26-nw-100m	A26	100	548729	128873
A26-nw-150m	A26	150	548700	128913
A26-nw-200m	A26	200	548670	128953
A26-se-5m	A26	5	548796	128783
A26-se-10m	A26	10	548799	128779
A26-se-20m	A26	20	548805	128771
A26-se-50m	A26	50	548822	128747
A26-se-100m	A26	100	548852	128707
A26-se-150m	A26	150	548881	128666
A26-se-200m	A26	200	548911	128626
B2110-ne-5m	B2110	5	544297	134312
B2110-ne-10m	B2110	10	544299	134317
B2110-ne-20m	B2110	20	544304	134325
B2110-ne-50m	B2110	50	544320	134351
B2110-ne-100m	B2110	100	544345	134394
B2110-ne-150m	B2110	150	544371	134437
B2110-ne-200m	B2110	200	544397	134480
B2110-sw-5m	B2110	5	544289	134298
B2110-sw-10m	B2110	10	544286	134294
B2110-sw-20m	B2110	20	544281	134285
B2110-sw-50m	B2110	50	544267	134259
B2110-sw-100m	B2110	100	544242	134215
B2110-sw-150m	B2110	150	544218	134171
B2110-sw-200m	B2110	200	544194	134127

Note: [1]The two alphabetical characters in the ID (e.g. sw, ne) refer to the location of the receptor point relative to the road (i.e. south-west, north-east).

[2]NGR = National Grid Reference (Easting, Northing) or (X,Y)

3.3.5 Dispersion Model

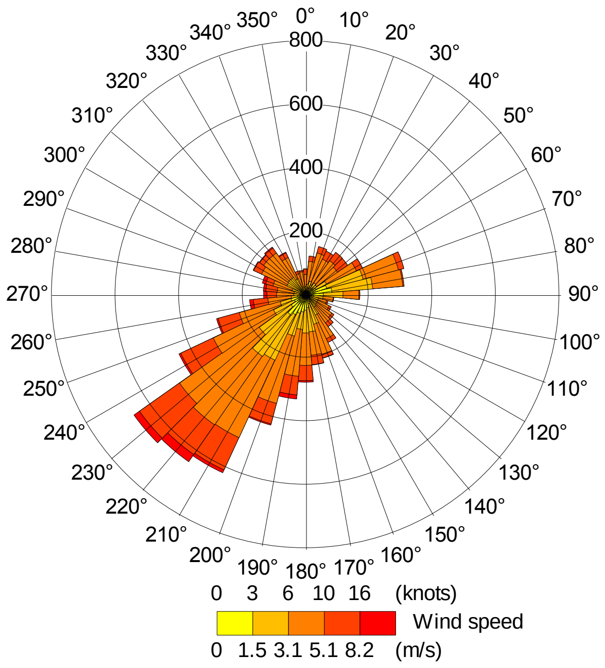
Detailed dispersion modelling of NOx was undertaken using ADMS-Roads atmospheric dispersion model from Cambridge Environmental Research Consultants (CERC).

3.3.6 Meteorological Data

The dispersion model requires as input representative meteorological data from a suitable synoptic station. Hourly sequential observation data for 2014 was used in the assessment from the meteorological station at Gatwick Airport (located approximately 10 km north-west of Ashdown Forest). Figure 2 shows the wind-rose for 2014, it can be seen that the predominant wind direction is south-westerly.

Most dispersion models for roads do not use meteorological data if they relate to calm winds conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. ADMS-Roads treats calm wind conditions by setting the minimum wind speed to 0.75m/s. Defra's LAQM.TG16[9] guidance recommends that the meteorological data file is tested in a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is particularly important when considering predictions of high percentiles and the number of exceedances and can also affect annual means. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%. Data capture for this data set was in excess of 99%, well above the 90% threshold. Therefore, the data meets the requirements of the Defra guidance and, due to its location and elevation it is considered to be the most representative meteorological station.

Figure 2: Wind rose for Gatwick Airport 2014 meteorological data



3.3.7 Other Model Parameters

The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the surface/ground over which the air is passing. Typical surface roughness values range from 0.0001m (for water or sandy deserts) to 1.5m (for cities, forests and industrial areas). In this assessment, a surface roughness value of 0.3m was used to reflect the predominant land use in the study area which is heathland with some trees.

3.3.8 Model Verification

Model verification refers to the comparison of modelled pollutant concentrations with measured concentrations at the same points to determine the performance of the model. Should the model results for NO_2 be largely within ±25% of the measured values and there is no systematic over or under-prediction of concentrations, then no adjustment is necessary according to Defra's LAQM.TG16 guidance[11]. If this is not the case, then the modelled values are adjusted based on the observed relationship between modelling and measured NO_x concentrations to provide a better agreement.

There are no local authority monitoring sites located on the modelled road network. There are two diffusion tube monitoring locations operated by MSDC to the north-west of the study area on the A22. Site MSAQ3 is a kerbside site and therefore not suitable for verification, but MSAQ5 although it is called a suburban site is 1.5m from the kerb of the nearest road and has been used for verification. Verification is best when it is carried out using data from several monitors and caution is advised when verifying with just one monitoring location. Monitoring results for this location were obtained from MSDC[19].

The dispersion model was run with traffic input data for 2014 to predict NO_x concentrations at the diffusion tube monitoring location (MSAQ5). The road contribution to total NO_x concentration has been calculated for use in the verification which was undertaken following the methodology contained in Defra guidance LAQM.TG16[11] and is described in section 5.1.

3.4 Post-processing

3.4.1 NO_x to NO_2 Conversion

For the assessment of road emissions Defra's LAQM.TG16[11] details an approach for calculating the conversion of roadside NO_x to NO_2, which takes into account the difference between ambient NO_x concentrations with and without the change in traffic, the concentration of ozone and the different proportions of primary NO_2 emissions in different years. This approach is available as a spreadsheet calculator. The latest version, version 5.1 released in June 2016, has been used.

3.4.2 Nutrient Nitrogen Deposition

The dry deposition flux for each receptor location has been calculated using the recommended deposition velocity in Table 3. Nitric oxide (NO) is assumed to have negligible deposition. The deposition velocity for "Forest" has been used in this assessment, as a worst case.

[19] Mid Sussex District Council (2017) Annual Status Report [accessed September 2017]

Table 3: Recommended dry deposition velocities

Chemical Species	**Recommended deposition velocity, m/s**	
NO_2	Grassland	0.0015
	Forest	0.003

The conversion factor used to convert dry deposition flux from units of µg/m^2/s to kg/ha/yr is shown in Table 4.

Table 4: Conversion factors to change units from µg/m^2/s of chemical species X to kg of X/ha/yr

Chemical species	**Conversion factor µg/m^2/s of species X to kg/ha/year**	
NO_2	Of N:	96

3.4.3 Significance Criteria – Ecological receptors

The impact of the change in road traffic can be referred to as the Process Contribution (PC) to concentrations and deposition rate. The combination of PC deposition rate and the background deposition rate is referred to as the Predicted Environmental Deposition Rate (PEDR).

The Defra/EA test on significance described in section 3.4.3 has been used:

- if the long-term PC is less than 1% of the long-term environmental standard for protected conservation areas, the emissions can be said to be **insignificant**.

3.4.4 Assumptions and Limitations

There are a number of limitations and uncertainties associated with modelling predictions. The model is required to simplify real world conditions based on a series of algorithms and is dependent on input data which itself may be uncertain. These limitations have been addressed as far as possible by verifying the modelled concentrations against monitoring data from an appropriate location.

Where assumptions have been required in this assessment they are detailed in the relevant sections.

4 Baseline Conditions

The overall approach to the baseline air quality assessment comprises a review of the existing air quality and nitrogen deposition conditions in the vicinity of Ashdown Forest.

4.1 Automatic Monitoring

There are no automatic monitoring sites within 3km of Ashdown Forest.

4.1.1 Diffusion Tube Monitoring

The passive diffusion tube monitoring sites within 3km of the Ashdown Forest are shown in Figure 3, and details of these monitoring locations are shown in Table 5.

NO_2 monitoring data from 2012 to 2016 is presented in Table 6. The closest diffusion tube to Ashdown Forest, W2, a roadside site in WDC, is located approximately 1km to the east of the Forest boundary. In 2016, the passive monitoring site at Lewes Road, East Grinstead measured 34.5µg/m^3 NO_2 which is below the annual mean objective (40µg/m^3). Concentrations at W1 and W2 were well below the objective in all the years for which there is data. No 2016 monitoring data was available for WDC at the time of writing.

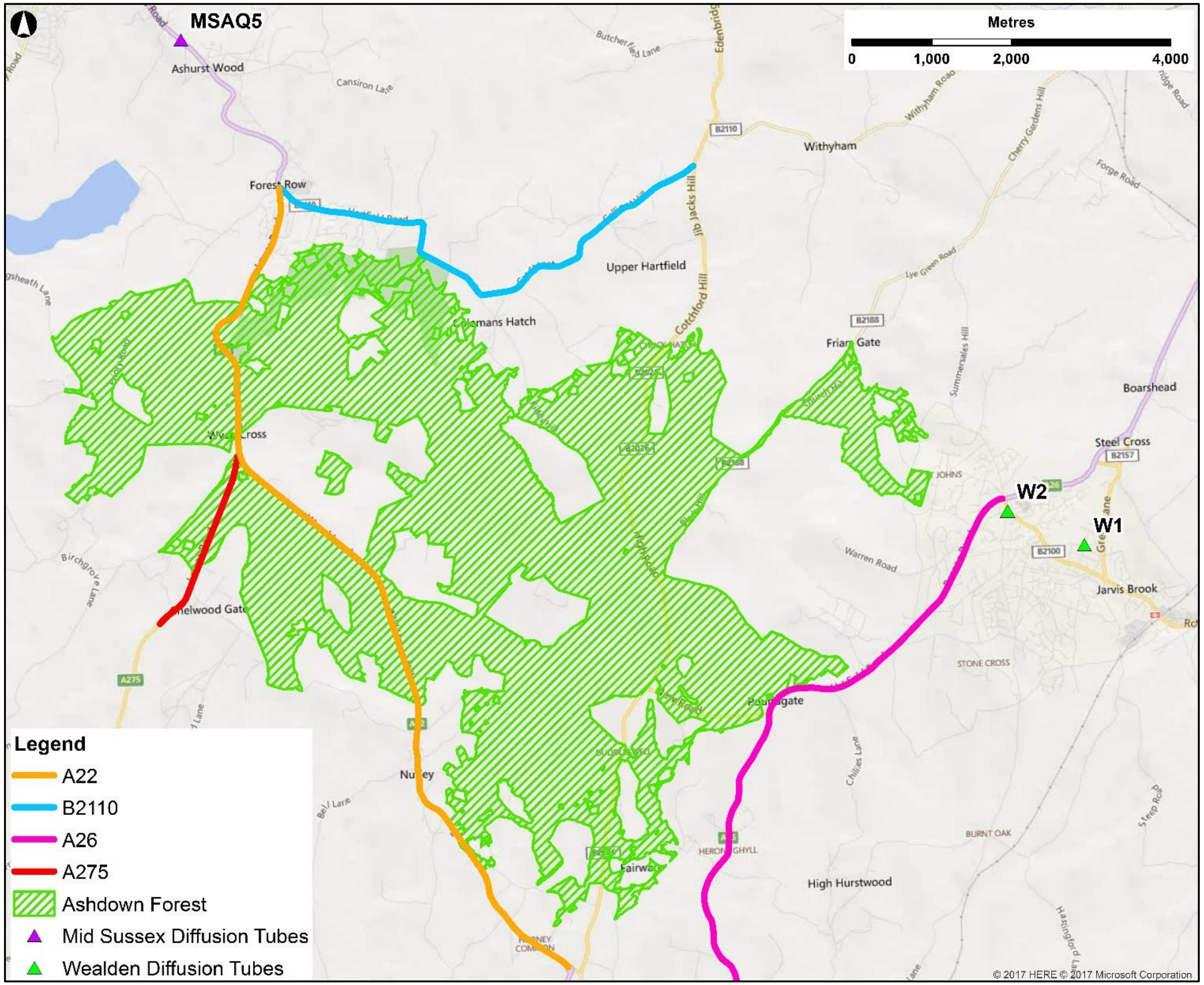
Table 5: Details of diffusion tube monitoring sites within 3km of Ashdown Forest

Site ID	Location	Type	NGR		Local authority
			X	Y	
W1	Crowborough Background	Urban background	552591	130667	WDC
W2	Crowborough Town Centre	Roadside	551626	131090	WDC
MSAQ5	Lewes Road East Grinstead	Suburban	541245	136996	MSDC

Table 6: NO_2 diffusion tube monitoring data within 3km of Ashdown Forest

Site ID	Location	Annual Mean NO_2 Concentrations (µg/m^3)				
		2012	2013	2014	2015	2016
W1	Crowborough Background	15	12	13	13	n/a
W2	Crowbororugh Town Centre	19	20	26	23	n/a
MSAQ5	Lewes Road East Grinstead	37.6	34.3	37.2	32.8	34.5
NO_2 annual mean objective 40µg/m^3						
Notes: n/a – data not available at the time or writing						

Figure 3 Location of diffusion tube monitoring sites within 3km of study area



4.2 Defra Background Concentrations

The Defra website[15] includes estimated background pollutant concentrations for NOx and NO_2 for each 1km by 1km OS grid square for years from 2014 to 2030. Background pollutant concentrations for the baseline year (2014) and the future year (2030, as 2031 is not available) have been obtained for the grid squares covering Ashdown Forest. The background concentrations for the grids covering the forest are presented in Appendix B. To represent the background pollutant concentration across the study area, an average of the grid values across the study area have been calculated. The average values are presented in Table 7 and are well below the annual mean objective.

The Defra background pollutant concentrations are considered more representative of background concentrations in the Forest than the monitoring data (Table 6). The average Defra backgrounds have therefore been used in the verification.

Table 7: Calculated average background concentrations across the study area

Year	**Calculated average background concentrations (μg/m^3)**	
	NO_x	**NO_2**
2014	12.5	9.3
2030	7.8	6.0

4.3 Background Deposition Rates

Table 8 shows the background nutrient nitrogen deposition rates at the sensitive habitats. The data has been taken from the APIS website,[9] where the background deposition rates are rates for 2011. The background deposition has been assumed to be constant between 2011 and 2030. This is a conservative (pessimistic) assumption as reduction in emissions on a regional and national basis due to cleaner vehicles are expected to reduce air concentrations of NOx and hence nitrogen deposition by 2031. By comparison the Highways England Design Manual for Roads and Bridges (DMRB) guidance document HA207/07[20] suggest that nitrogen deposition rates should be reduced by 2% per year to obtain appropriate levels for assessment of the future year. This would give a 33% reduction between 2011 and 2031. The DMRB guidance is used in assessing the impact of major road schemes for Highways England.

[20] http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/ha20707.pdf HA207/07 Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, May 2007

Table 8: Nutrient nitrogen background deposition rates (kg N/ha/yr)

Critical load class	**Feature**	**Nitrogen deposition (kg N/ha/yr)**
Broad-leaved, mixed and yew woodland	Alnus glutinosa - Carex paniculata woodland	Maximum: 23.8 Minimum: 21.98 Average: 22.58
	Alnus glutinosa - Urtica dioica woodland	Maximum: 23.8 Minimum: 21.98 Average: 22.58
Dry heaths	Dwarf shrub heath (Calluna vulgaris - Ulex minor heath)	Maximum: 15.12 Minimum: 13.72 Average: 14.27
Northern wet heath: Erica tetralix dominated wet heath	Dwarf shrub heath (Erica tetralix - Sphagnum compactum wet heath)	Maximum: 15.12 Minimum: 13.72 Average: 14.27

5 Assessment

5.1 Model Verification

The comparison between monitored and modelled NO_x concentrations is shown in Table 9. The monitored NO_x concentration presented in Table 9 has been calculated from the monitored NO_2 concentration of 37.2 μg/m^3 for 2014 (see Table 5) using the Defra conversion spreadsheet.

Table 9 shows that the difference between the monitored and modelled NO_x concentrations is greater than 25%. A verification factor of 2.96 has been applied to the modelled results for NO_X from road traffic. All results reported are after application of the verification factor to the modelled NOx from roads.

Table 9: Comparison of modelled and monitored annual mean NO_x concentrations (μg/m^3) (2014)

ID	Monitored NOx (μg/m^3)	Modelled NOx (μg/m^3)	% Difference (Monitored -Modelled)/ Monitored	Adjustment factor
MSAQ5	55.9	18.9	55.6%	2.96

5.2 Predicted Nutrient Nitrogen Deposition

5.2.1 Receptor Transects

Table 10 shows the predicted nutrient nitrogen deposition in kg N/ha/yr at each of the transect receptors and the process contribution (PC), the contribution from the change in vehicles due to the plan, as a percentage of the minimum critical load (CLmin).

The three habitats all have the same minimum and maximum critical loads: 10-20kg N/ha/yr. Dry heaths and Northern wet heaths have the background deposition rate and so the results are shown together in the table.

The maximum predicted increase in nutrient nitrogen deposition is 0.58% of the minimum critical load and is predicted to occur at 5m to the north-west of the A275. The maximum predicted decrease is 0.63% at 5m to the north-east of the B2110.

The change in nitrogen deposition is beneficial at some receptors. As all the PCs are less than 1% of the critical load, the effect can be said to be **insignificant**.

The PEDR, calculated using the average background nitrogen deposition rate for each habitat and the PC from the Do Something scenario, is shown as a percentage of both CLmin and CLmax. The results for each habitat are as follows:

- Broad-leaved mixed yew and woodland: the average background deposition rate exceeds CLmin (PEDR between 226% and 243%) and CLmax is also exceeded (PEDR between 113% and 121%). The PC does not cause an exceedance of the critical load.

- Dry heaths and Northern wet heath: the average background deposition rate exceeds CLmin (PEDR between 143% and 160%) but CLmax is not exceeded, although PDER is greater than 70% (PEDR between72% and 80%). The PC does not cause an exceedance of the critical load.

Table 10: Nitrogen deposition assessment results for broad-leaved mixed and yew woodland

ID	PC (DS) (kgN/ha /yr)	Change in PC (DS-DM) (kgN/ha/yr)	PC as % of CLmin	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax
				Broad-leaved mixed and yew woodland			Dry heaths and Northern wet heath		
A275-se-5m	1.538	0.05	0.52%	24.12	241%	121%	15.81	158%	79%
A275-se-10m	1.169	0.04	0.40%	23.75	237%	119%	15.44	154%	77%
A275-se-20m	0.760	0.03	0.26%	23.34	233%	117%	15.03	150%	75%
A275-se-50m	0.400	0.01	0.14%	22.98	230%	115%	14.67	147%	73%
A275-se-100m	0.233	0.01	0.06%	22.81	228%	114%	14.50	145%	73%
A275-se-150m	0.173	0.01	0.06%	22.75	228%	114%	14.44	144%	72%
A275-se-200m	0.138	0.00	0.03%	22.72	227%	114%	14.41	144%	72%
A275-nw-5m	1.642	0.06	0.58%	24.22	242%	121%	15.91	159%	80%
A275-nw-10m	1.253	0.04	0.43%	23.83	238%	119%	15.52	155%	78%
A275-nw-20m	0.806	0.03	0.29%	23.39	234%	117%	15.08	151%	75%
A275-nw-50m	0.426	0.01	0.14%	23.01	230%	115%	14.70	147%	73%
A275-nw-100m	0.245	0.01	0.06%	22.82	228%	114%	14.51	145%	73%
A275-nw-150m	0.179	0.01	0.06%	22.76	228%	114%	14.45	144%	72%
A275-nw-200m	0.144	0.01	0.06%	22.72	227%	114%	14.41	144%	72%
A22-sw-5m	1.115	-0.01	-0.06%	23.69	237%	118%	15.38	154%	77%
A22-sw-10m	0.832	0.00	-0.03%	23.41	234%	117%	15.10	151%	76%
A22-sw-20m	0.564	0.00	0.00%	23.14	231%	116%	14.83	148%	74%
A22-sw-50m	0.285	0.00	-0.03%	22.87	229%	114%	14.56	146%	73%
A22-sw-100m	0.164	0.00	0.00%	22.74	227%	114%	14.43	144%	72%
A22-sw-150m	0.118	0.00	0.00%	22.70	227%	113%	14.39	144%	72%
A22-sw-200m	0.098	0.00	0.00%	22.68	227%	113%	14.37	144%	72%

ID	PC (DS) (kgN/ha /yr)	Change in PC (DS-DM) (kgN/ha/yr)	PC as % of CLmin	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax
				Broad-leaved mixed and yew woodland			Dry heaths and Northern wet heath		
A22-ne-5m	1.714	-0.01	-0.06%	24.29	243%	121%	15.98	160%	80%
A22-ne-10m	1.267	-0.01	-0.06%	23.85	238%	119%	15.54	155%	78%
A22-ne-20m	0.873	0.00	-0.03%	23.45	235%	117%	15.14	151%	76%
A22-ne-50m	0.452	0.00	0.00%	23.03	230%	115%	14.72	147%	74%
A22-ne-100m	0.262	0.00	-0.03%	22.84	228%	114%	14.53	145%	73%
A22-ne-150m	0.190	0.00	0.00%	22.77	228%	114%	14.46	145%	72%
A22-ne-200m	0.153	0.00	0.00%	22.73	227%	114%	14.42	144%	72%
A26-nw-5m	1.359	-0.06	-0.60%	23.94	239%	120%	15.63	156%	78%
A26-nw-10m	0.988	-0.04	-0.43%	23.57	236%	118%	15.26	153%	76%
A26-nw-20m	0.642	-0.03	-0.29%	23.22	232%	116%	14.91	149%	75%
A26-nw-50m	0.311	-0.01	-0.12%	22.89	229%	114%	14.58	146%	73%
A26-nw-100m	0.164	-0.01	-0.09%	22.74	227%	114%	14.43	144%	72%
A26-nw-150m	0.112	-0.01	-0.06%	22.69	227%	113%	14.38	144%	72%
A26-nw-200m	0.086	0.00	-0.03%	22.67	227%	113%	14.36	144%	72%
A26-se-5m	0.766	-0.03	-0.35%	23.35	233%	117%	15.04	150%	75%
A26-se-10m	0.564	-0.03	-0.26%	23.14	231%	116%	14.83	148%	74%
A26-se-20m	0.386	-0.02	-0.17%	22.97	230%	115%	14.66	147%	73%
A26-se-50m	0.222	-0.01	-0.12%	22.80	228%	114%	14.49	145%	72%
A26-se-100m	0.147	-0.01	-0.06%	22.73	227%	114%	14.42	144%	72%
A26-se-150m	0.115	-0.01	-0.06%	22.70	227%	113%	14.39	144%	72%
A26-se-200m	0.095	-0.01	-0.06%	22.68	227%	113%	14.37	144%	72%
B2110-ne-5m	0.521	-0.06	-0.63%	23.10	231%	116%	14.79	148%	74%

ID	PC (DS) (kgN/ha /yr)	Change in PC (DS-DM) (kgN/ha/yr)	PC as % of CLmin	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax	PEDR (kgN/ha /yr)	PEDR as % of CLmin	PEDR as % of CLmax
				Broad-leaved mixed and yew woodland			Dry heaths and Northern wet heath		
B2110-ne-10m	0.395	-0.05	-0.46%	22.97	230%	115%	14.66	147%	73%
B2110-ne-20m	0.279	-0.03	-0.35%	22.86	229%	114%	14.55	145%	73%
B2110-ne-50m	0.158	-0.02	-0.20%	22.74	227%	114%	14.43	144%	72%
B2110-ne-100m	0.109	-0.01	-0.12%	22.69	227%	113%	14.38	144%	72%
B2110-ne-150m	0.092	-0.01	-0.09%	22.67	227%	113%	14.36	144%	72%
B2110-ne-200m	0.081	-0.01	-0.09%	22.66	227%	113%	14.35	144%	72%
B2110-sw-5m	0.331	-0.04	-0.40%	22.91	229%	115%	14.60	146%	73%
B2110-sw-10m	0.248	-0.03	-0.29%	22.83	228%	114%	14.52	145%	73%
B2110-sw-20m	0.167	-0.02	-0.20%	22.75	227%	114%	14.44	144%	72%
B2110-sw-50m	0.098	-0.01	-0.09%	22.68	227%	113%	14.37	144%	72%
B2110-sw-100m	0.066	-0.01	-0.06%	22.65	226%	113%	14.34	143%	72%
B2110-sw-150m	0.058	0.00	-0.03%	22.64	226%	113%	14.33	143%	72%
B2110-sw-200m	0.052	0.00	-0.03%	22.63	226%	113%	14.32	143%	72%

5.2.2 Grid Receptors

Using the predicted nitrogen deposition levels for the Do Minimum and Do Something scenarios for the grid receptors, the change in nitrogen deposition has been calculated across Ashdown Forest.

The calculated change in nitrogen deposition (kg N/ha/yr) is shown in Figure 4 for the entire study area. The change in nitrogen deposition near the A275, the only road for which traffic volumes with increase, is shown in a closer view in Figure 5. Where the change in deposition levels is negative, i.e. where deposition will be reduced with the scheme, the receptor points are shaded green. Where the change in deposition levels is minimal, the receptor points are shaded yellow.

Figure 4 and Figure 5 show that nitrogen deposition level will be reduced with the scheme for areas located adjacent the A26, A22 and B2110. The figures also show that for the majority of forest area the change in deposition levels is minimal (between -0.001 and 0.001 kg N/ha/yr).

By summing the change in nitrogen deposition for each receptor it has been determined that with the scheme there will be a net reduction in nitrogen deposition across Ashdown Forest. The calculated net reduction is 1.15 kg N/yr.

Figure 4: Predicted change in nitrogen deposition levels (kg N/ha/yr) in Ashdown Forest

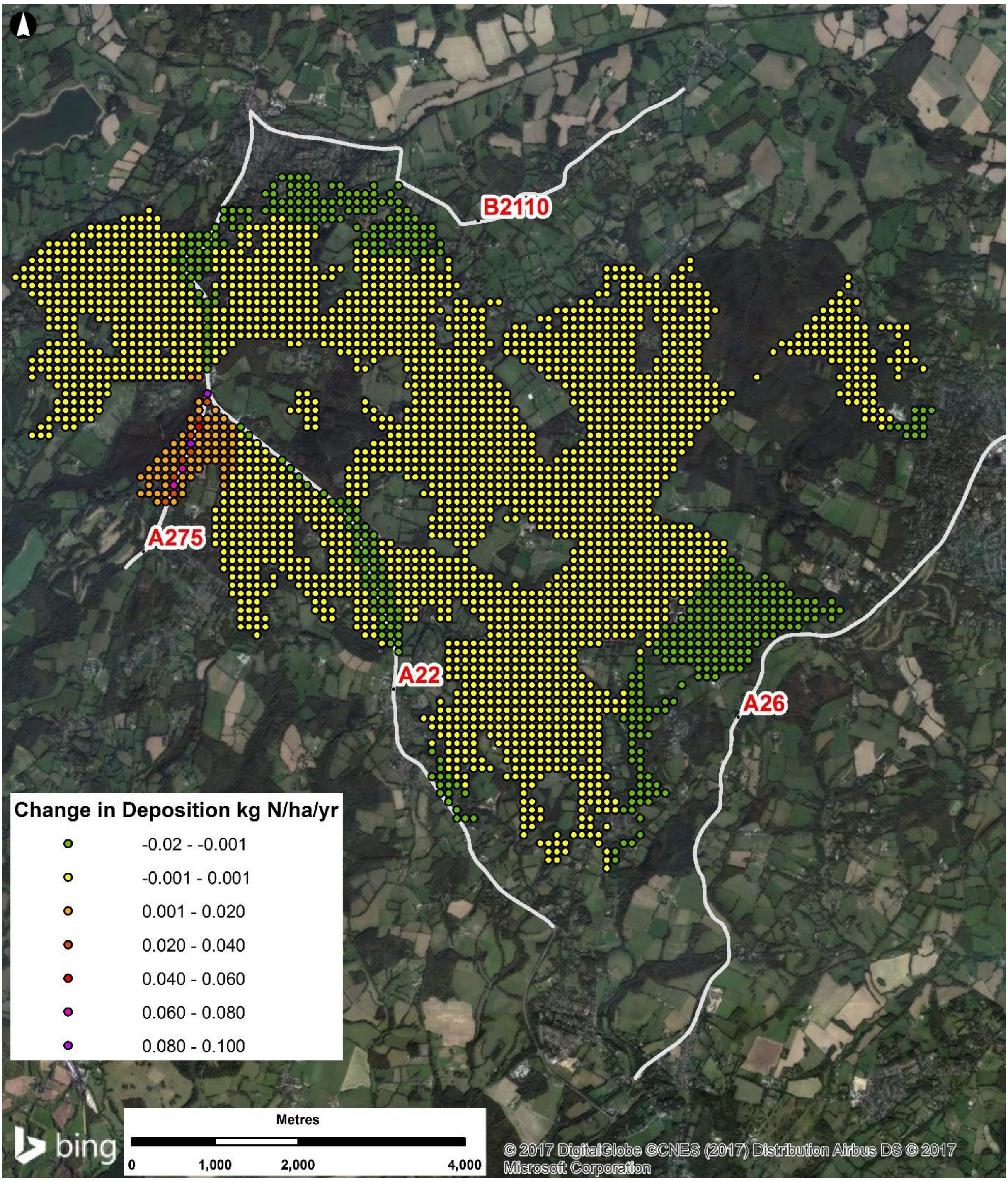
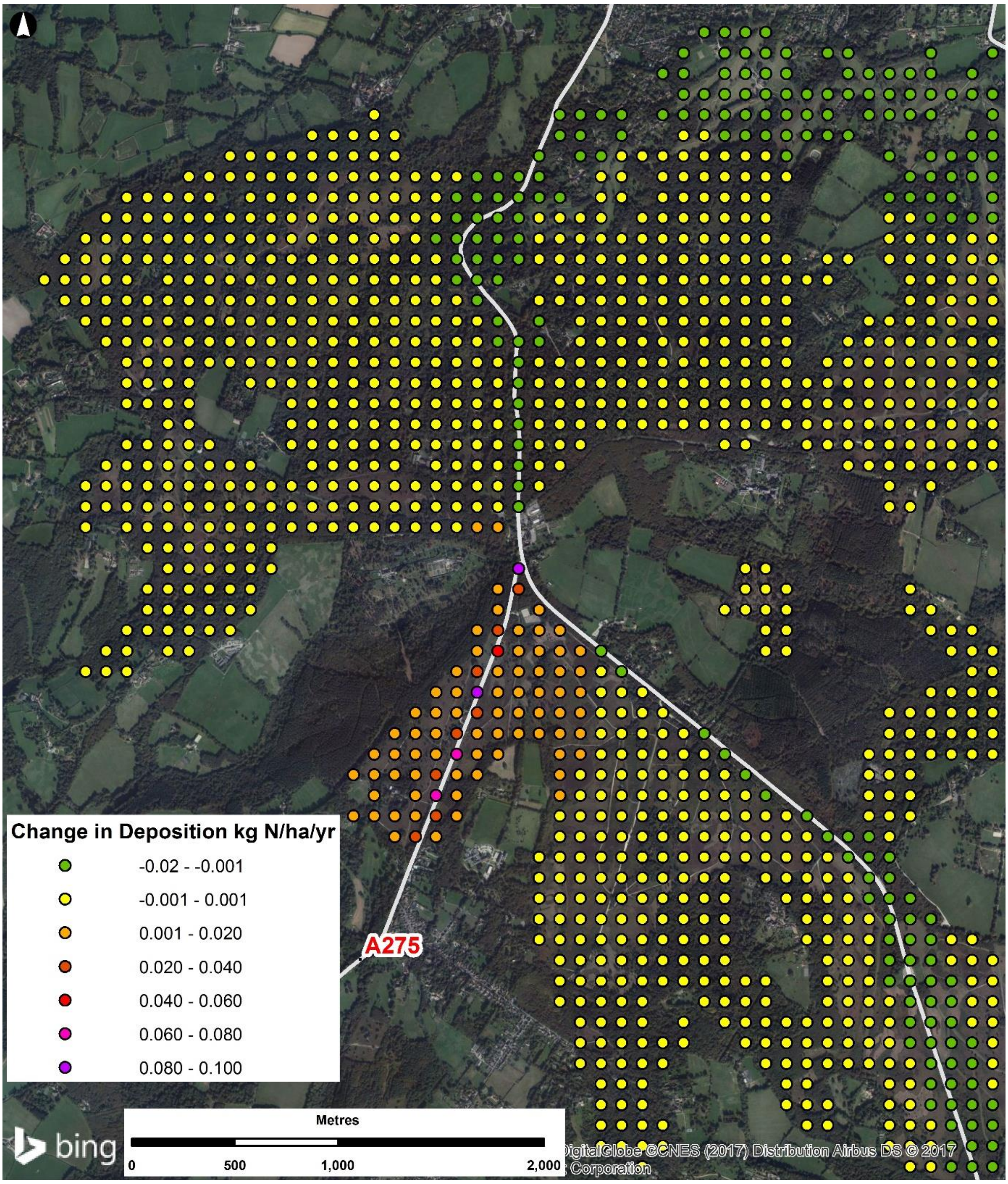


Figure 5: Close-up view of the predicted change in nitrogen deposition levels (kg N/ha/yr) near the A275



6 Summary and Conclusions

A review of the current legislation and planning policy, a baseline assessment describing the current air quality and nitrogen deposition conditions in the vicinity of the proposed development and an assessment of air quality impacts associated with changes to traffic volumes resulting from the MSDC proposed Plan has been undertaken.

Air quality modelling of vehicle traffic emissions has been carried out using the ADMS-Roads dispersion modelling software. Nitrogen deposition has been predicted across Ashdown Forest, using grid receptors and receptor transects.

Predicted nutrient nitrogen deposition at all the transect receptor points was less than 1% of the minimum critical load and is therefore insignificant. The maximum predicted increase in nutrient nitrogen deposition is 0.58% of the minimum critical load and is predicted to occur at 5m to the north-west of the A275. The maximum predicted decrease is 0.63% at 5m to the north-east of the B2110.

Based on predictions at grid receptors across the Ashdown Forest, nitrogen deposition levels will be reduced with the scheme for areas located adjacent to the A26, A22 and B2110. The predictions show that for the majority of forest area the change in deposition levels is minimal (between -0.001 to 0.001 kg N/ha/yr), with increases predicted only adjacent the A275.

By summing the change in nitrogen deposition for each receptor it has been determined that with the proposed Plan traffic there would be a net reduction in nitrogen deposition across Ashdown Forest. The calculated net reduction is 1.15 kg N/yr.

Appendix A

Traffic Data

A1 Traffic data

Table A.1: Traffic data used in the Base Case, Do Minimum and Do Something scenarios

Road ID	Base (2014)			Do Minimum (2031)			Do Something (2031)		
	AADT	HDV (%)	Speed (kph)	AADT	HDV (%)	Speed (kph)	AADT	HDV (%)	Speed (kph)
A26_Seg2	3,882	3.45	96.6	4,483	3.45	96.6	4,286	3.45	96.6
A26_Seg1	3,882	3.45	20.0	4,483	3.45	20.0	4,286	3.45	20.0
A26_Seg3	3,882	3.45	96.6	4,483	3.45	96.6	4,286	3.45	96.6
A26_Seg4b	3,882	3.45	80.5	4,483	3.45	80.5	4,286	3.45	80.5
A26_Seg5	3,882	3.45	64.4	4,483	3.45	64.4	4,286	3.45	64.4
A26_Seg6	3,882	3.45	72.4	4,483	3.45	72.4	4,286	3.45	72.4
A26_Seg7	3,882	3.45	80.5	4,483	3.45	80.5	4,286	3.45	80.5
A26_Seg8	3,882	3.45	80.5	4,483	3.45	80.5	4,286	3.45	80.5
A26_Seg9b	3,882	3.45	80.5	4,483	3.45	80.5	4,286	3.45	80.5
A26_Seg10	3,882	3.45	64.4	4,483	3.45	64.4	4,286	3.45	64.4
A26_Seg11	3,882	3.45	56.3	4,483	3.45	56.3	4,286	3.45	56.3
A26_Seg12	3,882	3.45	48.3	4,483	3.45	48.3	4,286	3.45	48.3
A26_Seg13	3,882	3.45	20.0	4,483	3.45	20.0	4,286	3.45	20.0
A26_Seg4a	3,882	3.45	80.5	4,483	3.45	80.5	4,286	3.45	80.5
A26_Seg9a	3,882	3.45	72.4	4,483	3.45	72.4	4,286	3.45	72.4
A275_Seg2	5,839	3.45	20.0	7,107	3.45	20.0	7,374	3.45	20.0
A275_Seg1	5,839	3.45	64.4	7,107	3.45	64.4	7,374	3.45	64.4
B2110_Seg2	1,968	3.45	48.3	2,247	3.45	48.3	1,984	3.45	48.3

B2110_Seg1	1,968	3.45	20.0	2,247	3.45	20.0	1,984	3.45	20.0
B2110_Seg3	1,968	3.45	48.3	2,247	3.45	48.3	1,984	3.45	48.3
B2110_Seg4	1,968	3.45	80.5	2,247	3.45	80.5	1,984	3.45	80.5
B2110_Seg5a	1,968	3.45	80.5	2,247	3.45	80.5	1,984	3.45	80.5
B2110_Seg6	1,968	3.45	64.4	2,247	3.45	64.4	1,984	3.45	64.4
B2110_Seg7	1,968	3.45	48.3	2,247	3.45	48.3	1,984	3.45	48.3
B2110_Seg8	1,968	3.45	64.4	2,247	3.45	64.4	1,984	3.45	64.4
B2110_Seg10	1,968	3.45	64.4	2,247	3.45	64.4	1,984	3.45	64.4
B2110_Seg9	1,968	3.45	64.4	2,247	3.45	64.4	1,984	3.45	64.4
B2110_Seg5b	1,968	3.45	80.5	2,247	3.45	80.5	1,984	3.45	80.5
A22_Seg2	4,920	3.45	96.6	6,272	3.45	96.6	6,245	3.45	96.6
A22_Seg1	4,920	3.45	20.0	6,272	3.45	20.0	6,245	3.45	20.0
A22_Seg3	4,920	3.45	56.3	6,272	3.45	56.3	6,245	3.45	56.3
A22_Seg5	4,920	3.45	48.3	6,272	3.45	48.3	6,245	3.45	48.3
A22_Seg4	4,920	3.45	48.3	6,272	3.45	48.3	6,245	3.45	48.3
A22_Seg6	4,920	3.45	48.3	6,272	3.45	48.3	6,245	3.45	48.3
A22_Seg7	4,920	3.45	64.4	6,272	3.45	64.4	6,245	3.45	64.4
A22_Seg8	4,920	3.45	96.6	6,272	3.45	96.6	6,245	3.45	96.6
A22_Seg9	4,920	3.45	80.5	6,272	3.45	80.5	6,245	3.45	80.5
A22_Seg10	4,920	3.45	64.4	6,272	3.45	64.4	6,245	3.45	64.4
A22_Seg11	4,920	3.45	96.6	6,272	3.45	96.6	6,245	3.45	96.6
A22_Seg12	4,920	3.45	64.4	6,272	3.45	64.4	6,245	3.45	64.4
A22_Seg14	4,920	3.45	20.0	6,272	3.45	20.0	6,245	3.45	20.0
A22_Seg13	4,920	3.45	48.3	6,272	3.45	48.3	6,245	3.45	48.3

Note: % HGVs were calculated based on traffic count data[21] from the two closest count sites to the study area. The count sites were located to the north (Count point ID 8450; A22 – south-east of East Grinstead) and south (Count point ID 73477; A272 – south-east of Scaynes Hill) of the study area. Speeds were selected based on the posted speed limit for the roads, which were obtained using the ITO website[22] and signs visible via use of the Google Earth street view.

[21] Department for Transport traffic count data, https://www.dft.gov.uk/traffic-counts/cp.php?la=West+Sussex accessed 26 September 2017
[22] Ito! map http://product.itoworld.com/map/124 accessed 26 September 2017

Appendix B

Defra Gridded Background Concentrations

B1 Defra Gridded Background Concentrations

Table B.1: Defra gridded background concentrations (µg/m^3) of NO_X and NO_2 for 2014 and 2030

OS Grid Square		2014		2030	
X	Y	NOx (µg/m^3)	NO_2 (µg/m^3)	NOx (µg/m^3)	NO_2 (µg/m^3)
540500	125500	12.76	9.45	7.97	6.09
540500	126500	13.04	9.65	8.14	6.21
540500	127500	13.39	9.88	8.32	6.34
540500	128500	13.16	9.73	8.23	6.27
540500	129500	13.00	9.62	8.15	6.21
540500	130500	12.97	9.59	8.14	6.20
540500	131500	12.93	9.56	8.16	6.22
540500	132500	13.06	9.65	8.25	6.29
540500	133500	13.10	9.68	8.29	6.32
540500	134500	13.19	9.74	8.36	6.36
541500	125500	12.60	9.34	7.88	6.02
541500	126500	12.52	9.28	7.86	6.00
541500	127500	12.81	9.48	8.02	6.12
541500	128500	13.07	9.66	8.17	6.23
541500	129500	13.15	9.72	8.18	6.24
541500	130500	13.30	9.83	8.27	6.30
541500	131500	13.36	9.87	8.32	6.34
541500	132500	13.80	10.18	8.54	6.50
541500	133500	13.86	10.22	8.61	6.55
541500	134500	13.61	10.04	8.60	6.54
542500	125500	12.40	9.20	7.76	5.93
542500	126500	12.39	9.19	7.77	5.94
542500	127500	12.43	9.22	7.81	5.97
542500	128500	12.55	9.30	7.88	6.02
542500	129500	12.69	9.40	7.95	6.07
542500	130500	12.93	9.57	8.06	6.15
542500	131500	13.75	10.15	8.46	6.44
542500	132500	13.05	9.65	8.21	6.26
542500	133500	13.58	10.02	8.50	6.47

OS Grid Square		2014		2030	
X	Y	NOx (µg/m^3)	NO_2 (µg/m^3)	NOx (µg/m^3)	NO_2 (µg/m^3)
542500	134500	15.25	11.17	9.50	7.18
543500	125500	12.22	9.08	7.66	5.86
543500	126500	12.18	9.04	7.64	5.84
543500	127500	12.33	9.15	7.71	5.90
543500	128500	12.34	9.16	7.74	5.91
543500	129500	12.65	9.38	7.88	6.02
543500	130500	13.30	9.84	8.16	6.23
543500	131500	12.55	9.31	7.91	6.04
543500	132500	12.66	9.38	8.00	6.11
543500	133500	12.79	9.47	8.10	6.17
543500	134500	13.91	10.24	8.80	6.68
544500	125500	12.32	9.15	7.66	5.86
544500	126500	12.57	9.32	7.76	5.94
544500	127500	13.31	9.84	8.12	6.19
544500	128500	13.02	9.64	7.99	6.10
544500	129500	12.34	9.16	7.69	5.88
544500	130500	12.23	9.08	7.66	5.86
544500	131500	12.19	9.06	7.70	5.88
544500	132500	12.34	9.16	7.79	5.95
544500	133500	12.55	9.31	7.91	6.04
544500	134500	13.09	9.68	8.17	6.23
545500	125500	13.10	9.71	7.93	6.06
545500	126500	12.88	9.55	7.83	5.99
545500	127500	12.07	8.97	7.49	5.74
545500	128500	11.98	8.91	7.46	5.72
545500	129500	11.80	8.78	7.39	5.66
545500	130500	11.77	8.77	7.39	5.66
545500	131500	11.81	8.79	7.45	5.71
545500	132500	11.99	8.92	7.54	5.77
545500	133500	12.36	9.18	7.71	5.90
545500	134500	12.38	9.19	7.75	5.92
546500	125500	13.04	9.67	7.90	6.04
546500	126500	12.53	9.30	7.67	5.87

OS Grid Square		2014		2030	
X	Y	NOx (µg/m^3)	NO_2 (µg/m^3)	NOx (µg/m^3)	NO_2 (µg/m^3)
546500	127500	12.15	9.03	7.51	5.75
546500	128500	11.97	8.91	7.44	5.70
546500	129500	11.67	8.70	7.32	5.61
546500	130500	11.79	8.78	7.39	5.66
546500	131500	12.03	8.95	7.53	5.77
546500	132500	11.87	8.84	7.48	5.73
546500	133500	12.08	8.98	7.57	5.80
546500	134500	12.64	9.37	7.87	6.01
547500	125500	12.41	9.22	7.62	5.84
547500	126500	12.43	9.23	7.61	5.82
547500	127500	11.89	8.85	7.40	5.67
547500	128500	11.85	8.82	7.38	5.66
547500	129500	11.83	8.81	7.38	5.66
547500	130500	12.08	8.99	7.50	5.75
547500	131500	11.89	8.85	7.47	5.72
547500	132500	11.99	8.92	7.52	5.75
547500	133500	12.12	9.01	7.57	5.80
547500	134500	12.25	9.10	7.65	5.85
548500	125500	12.41	9.22	7.61	5.83
548500	126500	12.19	9.07	7.50	5.75
548500	127500	12.44	9.24	7.60	5.82
548500	128500	12.45	9.25	7.62	5.84
548500	129500	11.74	8.74	7.35	5.63
548500	130500	11.80	8.79	7.41	5.68
548500	131500	11.92	8.87	7.49	5.73
548500	132500	11.90	8.86	7.49	5.73
548500	133500	11.77	8.76	7.43	5.69
548500	134500	11.82	8.80	7.45	5.70
549500	125500	12.15	9.03	7.51	5.75
549500	126500	12.02	8.94	7.44	5.70
549500	127500	11.94	8.89	7.41	5.68
549500	128500	12.50	9.29	7.65	5.86
549500	129500	12.22	9.09	7.57	5.79

OS Grid Square		2014		2030	
X	**Y**	**NOx (µg/m^3)**	**NO_2 (µg/m^3)**	**NOx (µg/m^3)**	**NO_2 (µg/m^3)**
549500	130500	12.08	8.98	7.56	5.79
549500	131500	11.95	8.89	7.54	5.77
549500	132500	12.15	9.04	7.62	5.83
549500	133500	12.11	9.00	7.59	5.81
549500	134500	11.80	8.78	7.45	5.70
Average		**12.53**	**9.29**	**7.81**	**5.97**