Land South and East of Adastral Park, Ipswich
Updated Air Quality ES Chapter and Appendices

19th June 2017

1 Introduction

Brookbanks Consulting Limited (BCL) is commissioned by Carlyle Land Ltd and Commercial Estates Group to provide technical advice on viability and delivery on a proposed mixed-use development at Adastral Park, Martlesham Heath, Suffolk.

An outline planning application has been submitted which, amongst other things, contains an Air Quality Environmental Statement Chapter. This document provides technical evidence to demonstrate robustness of the proposed Air Quality related mitigation measures proposed.

An Updated Air Quality ES Chapter and associated Appendices have been produced to respond to queries raised by Suffolk County Council.

The Updated Air Quality ES Chapter and Appendices is attached. The purpose of this cover sheet is to provide a brief summary of the additional information contained within the document.

2 Updated Air Quality ES Chapter – Additional Contents

HGV EMISSIONS

A request was made to confirm the HGV movements likely during the construction period. This information can be found in paragraph 6.2.18 within the ES Chapter.

AADT FLOW EXPLANATION

Clarification was sought on how the Annual Average Daily Traffic was determined. This information can be found at the beginning of Appendix 6.2.

2027 FUTURE YEAR MODELLING EXPLANATION

Clarification was sought to outline the choice for 2027 being the future year of the modelling. This has been selected as the future year to coincide with both:

i) Suffolk Coastal Local Plan Core Strategy 2013
ii) The traffic modelling future year as formally agreed with Suffolk County Council Highways.

6 AIR QUALITY (UPDATED)

6.1 Introduction

6.1.1 This chapter presents the findings of an assessment of local air quality effects associated with the Proposed Development.

6.1.2 The Proposed Development may introduce the following air quality effects;

- During the construction phase, suspended and re-suspended fugitive dust emissions from demolition / construction activities and vehicular emissions from construction traffic, including re-suspended dust from HGV movements; and
- During the operational phase, vehicular emissions (primarily nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) from increased traffic movements associated with the development.

6.1.3 The potential effects of the Proposed Development on local air quality during both construction and operational phases have been assessed. For both phases, the type, source and significance of potential effects are identified and the measures that should be employed to minimise these effects are described.

6.1.4 A glossary of common air quality terminology is provided in Appendix 6.1.

6.2 Assessment methodology and significance criteria

Scope of Assessment

6.2.1 The scope of the assessment has been determined in the following way:

- Consultation with the Environmental Health Officer (EHO) of Suffolk Coastal District Council (SCDC);
- Review of air quality data for the area surrounding the site and background pollutant maps; and
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.

6.2.2 There is the potential for impacts on local air quality during both the construction and operational phases of the Proposed Development. During the construction phase, there is the potential for impacts to occur as a result of dust and PM_{10} emissions. Guidance provided by the Institute of Air Quality Management (IAQM) (Ref. 6.1) includes the following criteria for assessing the effects of construction dust:

- A sensitive 'human receptor' within 350m of the site boundary or within 50m of the route used by construction vehicles on public highways up to 500m from the site entrance; and /or
- A sensitive 'ecological receptor' within 50m of the site boundary or within 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

6.2.3 A residential estate is located to the northwest of the site and a caravan park to the northeast. An assessment of construction phase impacts of emissions of dust and particulate matter on human receptors has therefore been included in this assessment.

There are no sensitive ecological sites within 50m of the site boundary. The Waldringfield Pit SSSI is located within the site boundary, it should be noted however that this was declared due to geological features rather than ecological importance. An assessment of construction phase impacts on sensitive ecological habitats has therefore not been included in this assessment.

6.2.4 During the operation of the Proposed Development there is the potential for impacts on local air quality to occur as a result of emissions from road vehicle trips generated by the operation of the Development. Guidance provided by the IAQM & Environmental Protection UK (EPUK) (Ref. 6.2) provides a threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality.

6.2.5 Data provided by the transport consultants indicates that the Proposed Development will result in an increase in traffic flows in excess of the threshold values. An assessment of impacts arising from vehicle emissions using the local roads has therefore been included in the assessment. The impacts are considered at sensitive human and ecological receptors within the vicinity of the roads likely to be affected by the Proposed

Development. Consideration has also been given to the suitability of the site for its proposed use.

6.2.6 Details of the assessment methodology and the specific issues considered are provided below.

Construction Phase Methodology

6.2.7 To assess the potential impacts associated with dust and PM_{10} releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM (Ref 6.1) has been undertaken.

6.2.8 This approach divides construction activities into the following dust emission sources:

- demolition;
- earthworks;
- construction; and
- trackout.

6.2.9 The risk of dust effects (low, medium or high) is determined by the scale (magnitude) and nature of the works and the proximity of sensitive human and ecological receptors.

6.2.10 The significance of the dust effects is based on professional judgement, taking into account the sensitivity of receptors and existing air quality.

Dust Emission Magnitude

6.2.11 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works.

Table 6.1 Dust Emission Magnitude Criteria

6.2.12 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.

Table 6.1 Dust Emission Magnitude Criteria

Source	Large	Medium	Small
Demolition	• Total building volume >50,000m^3 • Potentially dusty material (e.g. concrete) • On-site crushing and screening • Demolition activities >20m above ground level.	• Total building volume 20,000 - 50,000m^3 • Potentially dusty material • Demolition activities 10 - 20m above ground level.	• Total building volume <20,000m^3 • Construction material with low potential for dust release • Demolition activities <10m above ground level • Demolition during wetter months
Earthworks	• Total site area >10,000m^2 • Potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >8m in height • Total material moved >100,000 tonnes	• Total site area 2,500 -10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 - 10 heavy earth moving vehicles active at any one time • Formation of bunds 4 - 8m in height • Total material moved 20,000 - 100,000 tonnes	• Total site area <2,500m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <4m in height • Total material moved <20,000 tonnes • Earthworks during wetter months
Construction	• Total building volume >100,000m^3 • On-site concrete batching • Sandblasting	• Total building volume 25,000 - 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume <25,000m^3 • Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	• >50 HGV movements in any one day (a) • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m	• 10 - 50 HGV movements in any one day (a) • Moderately dusty surface material (e.g. silt) • Unpaved road length 50 - 100m	• <10 HGV movements in any one day (a) • Surface material with low potential for dust release • Unpaved road length <50m
(a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes.			

Receptor Sensitivity

6.2.13 The sensitivity of a receptor is classified as high, medium or low. **Error! Reference source not found.** presents the criteria provided by the IAQM guidance for defining the sensitivity of a receptor.

Table 6.2 Factors defining the Sensitivity of a Receptor

Sensitivity	Human (health)	Human (dust soiling)
High	• Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include residential dwellings, hospitals, schools and residential care homes.	• Regular exposure • High level of amenity expected. • Appearance, aesthetics or value of the property would be affected by dust soiling. • Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.
Medium	• Locations where workers are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include office and shop workers (b)	• Short-term exposure • Moderate level of amenity expected • Possible diminished appearance or aesthetics of property due to dust soiling • Examples include parks and places of work
Low	• Transient human exposure • Examples include public footpaths, playing fields, parks and shopping streets	• Transient exposure • Enjoyment of amenity not expected. • Appearance and aesthetics of property unaffected • Examples include playing fields, farmland (c), footpaths, short-term car parks and roads

(a) In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.
(b) Does not include workers exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.
(c) Except commercially sensitive horticulture.

6.2.14 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction-sites, any pre-existing screening such as trees or buildings and the

likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

6.2.15 The sensitivity of the area to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM_{10} concentrations in the area.

6.2.16 **Table 6.3** and Table 6.4 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively.

Table 6.3 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

Table 6.4 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} ($\mu g/m^3$)	Number of Receptors	Distance from the source (a)				
			<20m	<50m	<100m	<200m	<350m
High	> 32	> 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32	> 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28	> 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	>32 $\mu g/m^3$	> 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28-32 $\mu g/m^3$	> 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<28 $\mu g/m^3$	-	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

6.2.17 For each dust emission source (demolition, construction, earthworks and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

6.2.18 The risk of dust impacts prior to mitigation for each emission source is presented in Table 6.5, Table 6.6 and Table 6.7.

Table 6.5 Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 6.6 Risk of Dust Impacts – Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 6.7 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Construction Traffic

6.2.19 Construction traffic will contribute to existing traffic levels on the surrounding road network. The greatest potential for impacts on air quality from traffic associated with this phase of the Proposed Development will be in the areas immediately adjacent to the principal means of access for construction traffic.

6.2.20 Detailed information is not currently available regarding the numbers of vehicles associated with construction. However, it is considered that a worst case assumption

would likely be on average 2 or 3 deliveries per day. Considering the high proportion of HGVs currently using the A12, the impact of the construction vehicles would be relatively minor. As such, the flows are not predicted to be significant.

Operational Phase Methodology

6.2.21 Air quality at the site has been predicted using the ADMS Roads dispersion model (Version 4.0.1, December 2015). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

6.2.22 The model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Wattisham Meteorological Station for the year 2015 has been used for the assessment.

6.2.23 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM_{10} and $PM_{2.5}$) at selected receptors in the vicinity of the surrounding road network and within the Development itself. The predicted concentrations of NO_x have been converted to NO_2 using the NO_x to NO_2 calculator available on the Defra air quality website (Ref. 6.3).

6.2.24 Traffic data for road links affected by the Development Site has been provided by the Transport Consultants.

6.2.25 A summary of the traffic data used in the assessment can be found in Appendix 6.2. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

6.2.26 The following scenarios have been included in the assessment:

- 2015 – baseline traffic (for verification purposes);
- 2027 – baseline traffic (hereafter referred to as 'without development' scenario); and
- 2027 – baseline and development traffic (hereafter referred to as 'with development' scenario).

6.2.27 The emission factors released by Defra in July 2016, provided in the emissions factor toolkit EFT2016_7.0 have been used to predict traffic related emissions in 2015 and 2027. It should be noted that since the modelling was completed, the proposed opening year has been established to be the year 2032 rather than 2027. It is considered that the results of the modelling for the year 2027 will be a reasonable indication of the results for the year 2032.

6.2.28 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_x, NO_2, PM_{10} and $PM_{2.5}$ have been taken from the 2013 Defra background maps (issued July 2016). The maps provide an estimate of background concentrations between 2013 and 2030. The data used for the modelling assessment are set out in Table 6.13.

6.2.29 Background concentrations for 2015 have been used to predict concentrations in 2027 assuming no change in future years. This is considered to represent a worst-case prediction of future concentrations.

6.2.30 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG (16). Full details of the model verification process are presented in Appendix 6.3.

6.2.31 An overall verification factor of 1.94 was determined which indicates that the model is underpredicting compared to the monitored concentrations in this area. The modelled NO_x concentrations were adjusted using this factor prior to conversion to NO_2 using the NO_x to NO_2 calculation tool available on Defra's website.

6.2.32 Local roadside monitoring data were not available for concentrations of PM_{10} and $PM_{2.5}$. Modelled PM_{10} and $PM_{2.5}$ concentrations have therefore been adjusted by the verification factor obtained for NO_x, which is consistent with the guidance provided in LAQM.TG(16).

6.2.33 LAQM.TG(16) does not provide a method for the conversion of annual mean NO_2 concentrations to 1-hour mean NO_2 concentrations. However, research (Ref. 6.4) has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

6.2.34 A quantitative assessment of air quality at and around the Proposed Development site has been completed against the Air Quality Strategy objectives set out in Appendix 6.4 for NO_2, PM_{10} and $PM_{2.5}$. A quantitative assessment was also undertaken in assessing the results of the modelling for NO_x concentrations against the relevant critical level outlined in the Air Quality Strategy for the protection of ecological habitats.

6.2.35 Guidance provided in the Design Manual for Roads and Bridges Volume 11, Section 3, Part 1: Air Quality (Ref. 6.5) recommends that an assessment of nitrogen deposition is completed for SACs, SPAs, SSSIs and Ramsar sites. An assessment of nitrogen deposition has therefore been completed for the Sinks Valley Kesgrave SSSI (receptor E1). The nitrogen deposition rate was calculated using typical deposition velocities as recommended in the relevant guidance (Ref. 6.6). The calculated nitrogen deposition rates were compared with relevant critical loads for the protection of sensitive ecosystems and vegetation also set out in Appendix 6.4.

Significance Criteria

Construction Phase

6.2.36 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

Operational Phase

6.2.37 The significance of the predicted impacts is determined in accordance with the EPUK/ IAQM planning guidance, in combination with the professional judgement. The guidance recommends that the impact at individual receptors is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant Air Quality Assessment Level (AQAL) and examining this change in the context of the new total concentration and its relationship with the assessment criterion as summarised in Table 6.8.

Table 6.8 Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Years	% Change in concentration relative to AQAL (a)			
	1	2-5	5-10	>10
75% or less of AQAL	Negligible	Negligible	Slight adverse	Moderate adverse
76-94% of AQAL	Negligible	Slight adverse	Moderate adverse	Moderate adverse
95-102% of AQAL	Slight adverse	Moderate adverse	Moderate adverse	Substantial adverse
103-109% of AQAL	Moderate adverse	Moderate adverse	Substantial adverse	Substantial adverse
110% or more of AQAL	Moderate adverse	Substantial adverse	Substantial adverse	Substantial adverse
(a) A change in concentration of less than 0.5% of the AQAL is considered insignificant, however changes between 0.5% and 1% are rounded up to 1%.				

6.2.38 The EPUK/IAQM guidance notes that the criteria in Table 6.8 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK/IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

6.2.39 In order to determine whether the impacts of the change in NO_x concentrations at ecological habitats are significant, the EA guidance criteria have been used. These are outlined in Table 6.9 below.

Table 6.9 Significance Criteria for Ecological Sites

Ecological Habitats	Stage One	Stage Two
SPAs, SACs, Ramsar sites or SSSIs	The impact is considered insignificant if • Short term Process Contribution (PC) < 10% short term critical level; and • Long term PC < 1% long term critical level	The impact is considered to be insignificant if • Long term PC >1% and PEC <70% of the long term critical level.
Local Nature Sites (ancient woodlands, local wildlife sites, national and local nature reserves)	The impact is considered to be insignificant if: • Short term PC <100% short term critical level; and • Long term PC < 100% long term critical level	

6.2.40 There are no criteria for determining whether the impacts of nitrogen deposition are significant. The significance has therefore been determined using professional judgement.

Sensitive Receptors

6.2.41 LAQM.TG(16) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations 'where members of the public are regularly present' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

6.2.42 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

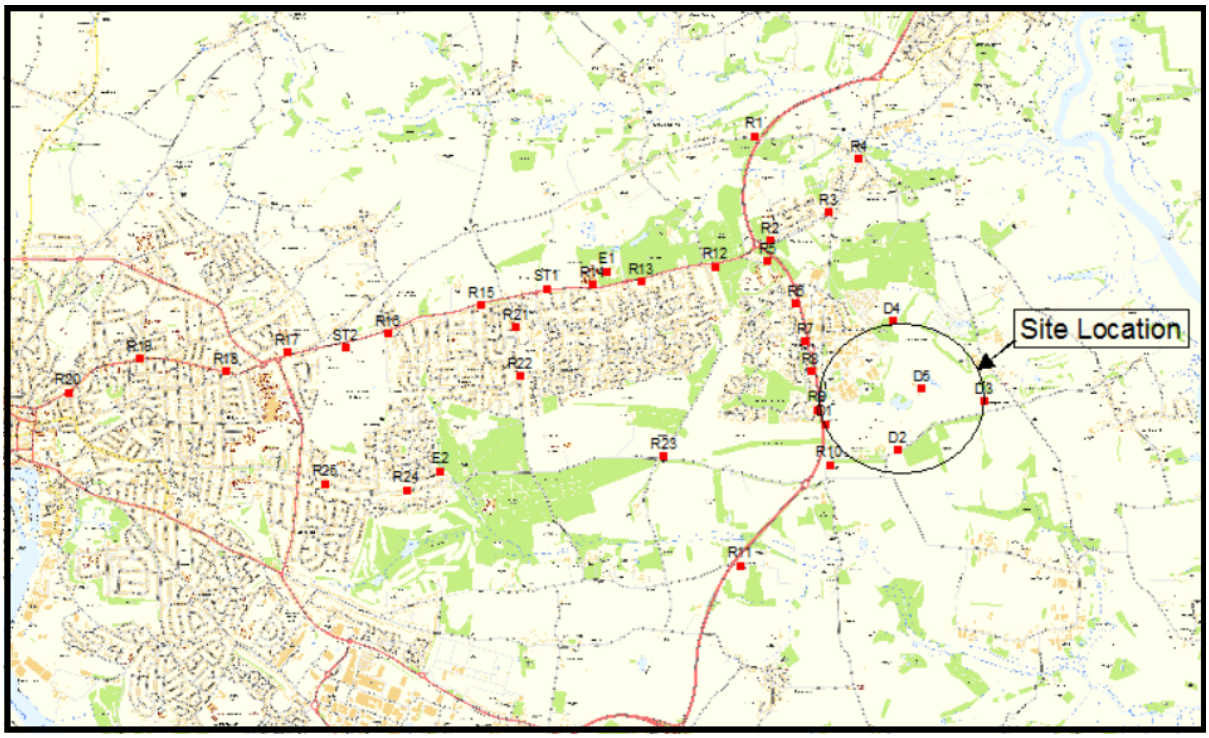
6.2.43 To assess the impact of traffic generated by the Proposed Development pollutant concentrations have been predicted at 29 existing sensitive receptors including 23 residential properties, two schools, two short term receptors and two sensitive ecological habitats close to the roads affected by traffic generated by the Proposed Development. Five locations within the Proposed Development itself were also included. Details of these sensitive receptors are presented in Table 6.10 and the locations are illustrated in Figure 6.1.

6.2.44 The modelling assessment also predicted concentrations at four locations within the Proposed Development itself.

Table 6.10 Location of Sensitive Receptors

ID	Receptor	Type	Easting	Northing
R1	Property on Martlesham Road	Residential	624146.9	247380.6
R2	The Firs, off Main Street	Residential	624303.4	246332.2
R3	1 Crown Close	Residential	624886.6	246621.1
R4	The Red House	Residential	625191.6	247149.3
R5	Cody Cottage	Residential	624279.8	246131.5
R6	90 Manor Road	Residential	624562.4	245711.7
R7	36 Burgess Place	Residential	624653.8	245334.1
R8	16 Coopers Road	Residential	624707.6	245036.3
R9	34 Lancaster Drive	Residential	624778.9	244649.2
R10	1 Aerodrome Cottage	Residential	624896.0	244096.0
R11	1 Lewis Cottage	Residential	624001.9	243091.7
R12	349 Main Road	Residential	623753	246075.8
R13	245 Main Road	Residential	623017.4	245923.2
R14	Kesgrave High School	Residential	622533.4	245893.6
R15	77 Main Street	Residential	621419.8	245690.8
R16	45 Main Street	Residential	620481	245413.5
R17	71 Main Street	Residential	619478.4	245217
R18	921 Woodbridge Road	Residential	618866.6	245029.9
R19	437 Woodbridge Road	Residential	618008.8	245160
R20	198 Woodbridge Road	Residential	617289.8	244821.7
R21	Heath Primary School	Residential	621767.5	245475.5
R22	120 Bell Road	Residential	621801.6	244988.4
R23	2 Nursery Cottages	Residential	623242	244181.4
R24	785 Foxhall Road	Residential	620668.1	243848.9
R25	670 Foxhall Road	Residential	619861.2	243909.5
ST1	Kesgrave High School Playing Fields	Residential	622072.7	245859
ST2	Rushmere Golf Course	Residential	620067.6	245272
E1	Sinks Valley Kesgrave SSSI	Ecological	622678	246030
E2	Mill Stream LNR	Ecological	621013	244034
D1	Proposed Development (West)	Proposed	624849	244506
D2	Proposed Development (South)	Proposed	625576	244242
D3	Proposed Development (East)	Proposed	626440	244733
D4	Proposed Development (North)	Proposed	625526	245540
D5	Proposed Development (Centre)	Proposed	625820	244858

Figure 6.1 Location of Receptors Considered within ADMS Model



6.3 Consultation undertaken

6.3.1 Consultation was undertaken with the Environmental Health Officer of SCDC to confirm the scope of assessment. The following comments were made:

Table 6.11 Summary of Consultation with EHO of SCDC

Date	Comments
Email received 2nd March 2017 from the EHO of SCDC	The traffic data used in the air quality modelling should be approved and accepted by the Highways Authority, Suffolk County Council. It was requested that the following impacts should be included in the assessment: • The impact of construction; • The impact of the development on AQMAs; and • Any nearby sources of pollution that may affect the development.

6.4 Legislation, Planning Policy and Guidance

Legislation

The European Directive on Ambient Air and Cleaner Air for Europe

6.4.1 European Directive 2008/50/EC (Ref. 6.7) of the European Parliament and of the Council of 21st May 2008, sets legally-binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union's air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

6.4.2 The pollutants included are sulphur dioxide (SO_2), NO_2, PM_{10}, $PM_{2.5}$, lead (Pb), carbon monoxide (CO), benzene (C_6H_6), ozone (O_3), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

6.4.3 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007 (Ref. 6.8), pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

6.4.4 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are C_6H_6, 1,3-butadiene ($C3H_6$), CO, Pb, NO_2, PM_{10}, $PM_{2.5}$, SO_2, O_3 and PAHs.

6.4.5 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive

members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

6.4.6 The air quality objectives are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

6.4.7 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

6.4.8 The AQS also contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$'. Local Authorities are required to work towards reducing emissions / concentrations of $PM_{2.5}$, but there is currently no statutory objective incorporated into UK law at this time.

6.4.9 The AQS objective levels relevant to this assessment are set presented in Appendix 6.4.

Air Quality (England) Regulations

6.4.10 Many of the objectives in the AQS were made statutory in England through the Air Quality (England) Regulations 2000 (Ref 6.9) and the Air Quality (England) (Amendment) Regulations 2002 (the Regulations) (Ref 6.10) for the purpose of Local Air Quality Management (LAQM).

6.4.11 The Air Quality Standards Regulations 2010 (Ref 6.11) came into force on the 10th June 2010 and have adopted into UK law the limit values required by EU Directive 2008/50/EC. These regulations prescribe the 'relevant period' (referred to in Part I2V of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'.

6.4.12 Ozone is not included in the Regulations as, due to its transboundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

Local Air Quality Management (LAQM)

6.4.13 Part IV of the Environment Act 1995 also requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

6.4.14 Where any of the prescribed air quality objectives are not likely to be achieved, the authority concerned must designate that part an Air Quality Management Area (AQMA).

6.4.15 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities

are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

6.4.16 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work (Ref. 6.12). This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.

Planning Policy

National Planning Policy Framework

6.4.17 The National Planning Policy Framework (NPPF) (Ref. 6.13) sets out the Government's planning policies for England and how these are expected to be applied.

6.4.18 At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

6.4.19 Current planning law requires that applications for planning permission must be determined in accordance with the relevant development plan. The NPPF should be taken into account in the preparation of development plans and the policies set out within the Framework are a material consideration in planning decisions.

6.4.20 The NPPF identifies 12 core planning principles that should underpin both plan-making and decision-taking, including a requirement for planning to *'contribute to conserving and enhancing the natural environment and reducing pollution'*.

6.4.21 Under Policy 11: Conserving and Enhancing the Natural Environment, paragraph 109 states that '*the planning system should contribute to and enhance the natural and local environment by preventing both new and existing* developments *from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution'*.

6.4.22 In dealing specifically with air quality, paragraph 124 of the Framework 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'*.

Suffolk Coastal Local Plan Core Strategy 2013

6.4.23 The Suffolk Coastal Core Strategy (Ref 6.14) is the central part of the local plan which will guide development across the District until 2027:

6.4.24 Development Management Policy DM23 – Residential Amenity, states:

'When considering the impact of new development on residential amenity, the Council will have regard to the following

- *light spillage, air quality and other forms of pollution*

Development will be acceptable where it would not cause an unacceptable loss of amenity to adjoining or future occupiers of the development'.

Control of Dust and Particulates associated with Construction

6.4.25 Section 79 of the Environmental Protection Act (1990) provides the following definitions of statutory nuisance relevant to dust and particles:

- 'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and
- 'any accumulation or deposit which is prejudicial to health or a nuisance'.

6.4.26 Following this, Section 80 states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

6.4.27 In the context of the proposed development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

6.4.28 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

EPUK & IAQM Land Use Planning and Development Control

6.4.29 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in May 2015 (Ref. 6.2) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

6.4.30 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

6.4.31 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

6.4.32 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities (Ref. 6.1). The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.

6.4.33 This guidance has been used within this assessment.

6.5 Existing environment

Suffolk Coastal District Council Review and Assessment of Air Quality

6.5.1 Suffolk Coastal District Council (SCDC) has carried out detailed assessments of air quality (Ref. 6.15) in the area and as a result has declared two areas as AQMA due to potential exceedences of the AQS objectives for annual mean NO_2 concentrations. These are:

- Woodbridge Junction AQMA, which was declared in 2006 and covers 6 properties on the western side of the Throughfare / Melton Hill arm of Woodbridge Junction; and
- Stratford St Andrew AQMA which was declared in 2014 and covers 4 properties at Long Row, Main Road in Stratford St Andrew.

6.5.2 The closest is the Woodbridge Junction AQMA, which is located approximately 4.2km to the northeast of the site.

Automatic Local Monitoring Data

6.5.3 SCDC operates one automatic monitoring site, which is a kerbside monitoring site located within the Woodbridge Junction AQMA. Due to the distance and setting of the monitoring site, it is considered that pollutant concentrations measured at this location would not be a suitable estimate of the concentrations likely to be experienced at the site.

Non-Automatic Monitoring

6.5.4 NO_2 diffusion tube monitoring is also carried out at a number of locations in the district. Three diffusion tubes are located in the vicinity of the site, they are all at roadside locations. Bias adjusted data from these monitoring sites are presented in Table 6.12 below. Monitoring has also been undertaken at an urban background site in Woodbridge. Although more distant from the site, it is set back from the major roads and therefore provides an indication of likely background concentrations in the area. Bias adjusted data from this monitoring site is also provided in Table 6.12 below.

Table 6.12 NO_2 concentrations recorded at the nearest Diffusion Tube Monitoring Locations

Monitoring Site	Type	2011	2012	2013	2014	2015
MRT 1	Roadside	24	21	21	22	24
MRT 2	Roadside	-	-	-	16	-
KSG 9	Roadside	34	31	28	29	28
WBG 3	Urban Background	16	15	14	13	12

6.5.5 There have been no exceedences of the AQS objective level for annual mean NO_2 concentrations at the nearby or background monitoring sites over the five year period studied. Therefore, it is likely that the existing concentrations within the site are currently below the AQS objective level for annual mean NO_2 concentrations.

Defra Background Maps

6.5.6 Additional information on background concentrations in the vicinity of the site have been obtained from the Defra background pollutant maps. The 2013 Defra background maps provide estimated concentrations for the years 2013 to 2030. For the purposes of this assessment 2015 background concentrations have been used. The average pollutant concentrations from the grid squares representing the assessment area have been extracted from the maps which include the development site and road links included in the modelling assessment. The background concentrations are presented in Table 6.13 below.

Table 6.13 Estimated Annual Mean Background Concentrations from Defra Maps (µg/m3)

Grid Reference	Relevant Receptors	NO_x	NO_2	PM_{10}	$PM_{2.5}$
624500, 247500	R1	17.2	12.5	16.8	11.6
625500, 247500	R4	15.6	11.4	16.2	11.1
623500, 246500	R12	15.9	11.6	15.3	10.8
624500, 246500	R2, R3, R5	18.3	13.2	15.9	11.3
618500, 245500	R18, R19	21.6	15.3	16.1	11.6
619500, 245500	R17	21.1	14.9	16.0	11.4
620500, 245500	R16, ST2	17.3	12.5	15.8	11.2
621500, 245500	R15, R21	17.1	12.4	15.7	11.2
622500, 245500	R14, ST1	17.0	12.3	15.9	11.0
623500, 245500	R13	16.0	11.6	16.0	11.2
624500, 245500	R6, R7, R8	19.7	14.1	15.9	11.3
625500, 245500	D4	15.1	11.0	15.5	11.0
617500, 244500	R20	23.6	16.5	16.6	12.0
621500, 244500	R22	15.7	11.4	15.5	11.0
622500, 244500		14.9	10.9	16.2	11.3
623500, 244500	R23	15.5	11.3	15.8	11.1
624500, 244500	R9, R10, D1	17.5	12.7	16.7	11.6
625500, 244500	D2, D5	14.6	10.7	16.0	11.2
626500, 244500	D3	13.5	9.9	16.3	11.2
619500, 243500	R25	20.2	14.4	15.6	11.3
620500, 243500	R24	17.2	12.4	14.9	10.8
624500, 243500	R11	19.0	13.6	16.9	11.6

6.6 Predicted impacts

Construction Phase Effects

Area Sensitivity

6.6.1 The Proposed Development Site is currently occupied by a mix of uses. In the north there is currently a science and business park, woodlands, ponds and grassland. The central area is currently occupied by a quarry and sand and gravel extraction operations. The remaining site is currently occupied by agricultural land.

6.6.2 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 6.14.

Table 6.14 Sensitivity of Receptors and the Local Area to Dust Impacts

Receptor	Distance from Site Boundary (m)	Approx Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	5-10	High	Low	High	Medium
	<50 m	15-20	High	Low	High	Medium
Overall Sensitivity of the Area			**Low**		**Medium**	
(a) Estimated background PM_{10} concentration is 16						

6.6.3 Construction traffic will access the site via the A12. The site is large, therefore receptors within 500m along the A12 from the site access are considered to determine the sensitivity of the area to effects from track-out. There are between 40 and 50 sensitive human receptors within 50m of the road within 500m from the site entrance therefore the sensitivity of the area to effects from track-out is considered to be medium for dust and low for human health effects.

6.6.4 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

6.6.5 The prevailing wind is from the southwest, therefore receptors to the northeast of the Development Site are the most likely to experience dust impacts from the development. The area to the northeast of the site is predominantly open fields and a caravan park.

Dust Emission Magnitude

6.6.6 Dust emissions during the demolition phase will depend on the type of material within the buildings to be demolished and the demolition activities undertaken on-site. As the site is large and there are a lot of buildings (approximately 90 within the science and business park), the magnitude of dust emissions for the demolition phase is considered to be large.

6.6.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the site and landscaping. The area of the site is

approximately 113.3ha. During earthworks there is likely to be more than 10 heavy duty vehicles on-site at any given time and materials are likely to be stored in bunds greater than 8m in height. The magnitude of the dust emission for the earthworks phase is therefore considered to be large.

6.6.8 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. The completed development will have a volume of greater than 100,000m^3 and the main construction material would involve the use of concrete, known to be a dusty material. Based on the overall size of the development the dust emission magnitude is considered to be large.

6.6.9 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will access the site via the A12. The number of HGV movements (leaving the site) is not

currently known but is likely to be greater than 50 per day during peak periods, therefore dust emission magnitude due to trackout is considered to be large.

Dust Risk Effects

6.6.10 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health and ecological effects and high overall sensitivity to dust soiling impacts, is presented in Table 6.15Table 6.15.

Table 6.15 Risk of Dust Impacts Prior to Mitigation

Source	Impact Magnitude	Human Health Risk	Dust Soiling Risk
Demolition	Large	Medium	High
Earthworks	Large	Low	Medium
Construction	Large	Low	Medium
Trackout	Large	Low	Medium

Operation Phase Effects

Predicted NO_2 Concentrations

6.6.11 Annual mean NO_2 concentrations, predicted at the identified receptor locations are presented in Table 6.16 below.

Table 6.16 Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)

Receptor	2027		Development Impact (as a % of the AQO)	Impact Significance
	Without Development	With Development		
R1	13.9	14.0	0.2	Negligible
R2	15.2	15.3	0.0	Negligible
R3	14.3	14.2	-0.2	Negligible
R4	12.4	12.3	-0.2	Negligible
R5	14.9	15.0	0.1	Negligible
R6	17.2	17.3	0.2	Negligible
R7	16.8	16.9	0.2	Negligible
R8	16.4	16.5	0.1	Negligible
R9	15.9	16.0	0.2	Negligible
R10	14.2	14.4	0.3	Negligible
R11	15.7	15.7	0.1	Negligible
R12	12.7	12.8	0.3	Negligible
R13	12.5	12.6	0.3	Negligible
R14	13.4	13.5	0.3	Negligible
R15	14.4	14.6	0.6	Negligible
R16	13.7	13.8	0.4	Negligible
R17	15.9	16.0	0.3	Negligible
R18	18.5	18.6	0.0	Negligible
R19	17.6	17.7	0.0	Negligible
R20	19.7	19.7	0.0	Negligible
R21	12.9	13.0	0.4	Negligible
R22	11.9	12.1	0.4	Negligible
R23	12.6	12.7	0.2	Negligible
R24	14.0	14.0	0.0	Negligible
R25	16.0	16.0	0.0	Negligible
ST1	13.7	13.9	0.4	-
ST2	13.2	13.2	0.2	-
D1	-	19.1	0.4	-
D2	-	12.2	1.9	-
D3	-	10.4	0.4	-

D4	-	11.3	0.0	-
D5	-	11.0	0.1	-

6.6.12 The results of the modelling indicate that in the opening year of 2027, the AQS objective level for annual mean NO_2 concentrations will be met at all of the receptor locations included within the assessment.

6.6.13 The greatest increase as a result of emissions from the traffic generated by the Proposed Development is 0.25µg/m^3 which equates to 0.6% of the AQAL. According to the IAQM & EPUK significance criteria set out in Table 6.8, the effect of the Proposed Development on local air quality with regard to annual mean NO_2 concentrations is considered to be negligible.

6.6.14 The predicted annual mean NO_2 concentrations are all below 60µg/m^3, therefore it is considered likely that the AQS objective level for hourly mean NO_2 concentrations will also be met. Therefore, the impact of the Proposed Development with regard to hourly mean NO_2 concentrations is also considered to be negligible.

6.6.15 Within the site itself (receptors D1 to D5) annual mean NO_2 concentrations are predicted to fall well below the relevant AQAL. It is also expected that the hourly mean objective

level within the site will be met. The impact with regards to new exposure is therefore also considered to be negligible.

Predicted PM_{10} Concentrations

6.6.16 Predicted annual mean PM_{10} concentrations at the identified receptor locations are presented below in Table 6.17.

Table 6.17 Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

Receptor	2027		Development Impact (as a % of the AQO)	Impact Significance
	Without Development	With Development		
R1	17.4	17.5	0.1	Negligible
R2	16.9	16.9	0.0	Negligible
R3	16.4	16.4	-0.1	Negligible
R4	16.6	16.6	-0.1	Negligible
R5	16.8	16.8	0.1	Negligible
R6	17.4	17.4	0.1	Negligible
R7	17.3	17.3	0.1	Negligible
R8	17.0	17.1	0.1	Negligible
R9	18.3	18.3	0.1	Negligible
R10	17.5	17.5	0.2	Negligible
R11	17.9	17.9	0.1	Negligible
R12	15.8	15.9	0.2	Negligible
R13	16.4	16.5	0.1	Negligible
R14	16.4	16.4	0.2	Negligible
R15	16.7	16.8	0.3	Negligible
R16	16.4	16.5	0.2	Negligible
R17	16.5	16.5	0.1	Negligible
R18	17.6	17.6	0.0	Negligible
R19	17.2	17.2	0.0	Negligible
R20	18.1	18.1	0.0	Negligible
R21	15.9	15.9	0.2	Negligible
R22	15.7	15.7	0.2	Negligible
R23	16.4	16.4	0.1	Negligible
R24	15.7	15.7	0.0	Negligible
R25	16.4	16.4	0.0	Negligible
ST1	16.5	16.6	0.2	-
ST2	16.1	16.2	0.1	-
D1	19.8	19.9	0.2	-
D2	16.4	16.8	1.0	-
D3	16.4	16.4	0.2	-

D4	15.7	15.7	0.0	-
D5	16.1	16.2	0.1	-

6.6.17 The results of the modelling indicate that predicted annual mean PM_{10} concentrations are well below (less than 75%) the AQS objective level of 40 µg/m^3 at all the selected receptors both with and without the Proposed Development operational.

6.6.18 Traffic associated with the Proposed Development is predicted to result in a maximum increase in the annual mean PM_{10} concentration of 0.13µg/m^3 which equates to 0.3% of the AQAL. In accordance with the IAQM & EPUK significance criteria as set out in Table 6.8, the effect on local air quality with regards to this pollutant is considered to be negligible.

6.6.19 LAQM.TG(16) provides a relationship between predicted annual mean concentrations and the likely number of exceedances of the short-term (24-hour mean) PM_{10} objective of 50 µg/m^3 (N), where:

$$N = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean}).$$

6.6.20 The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32 µg/m^3.

6.6.21 Based on the above approach, the maximum number of days where PM_{10} concentrations are predicted to exceed 50µg/m^3 is 2 days with a change of less than one day as a result of the operation of the Development. The impact on 24 hour PM_{10} concentrations is therefore also considered to be negligible.

6.6.22 Within the site itself, annual mean and 24hour mean PM_{10} concentrations are predicted to fall well below the relevant AQAL. The effect with regards to new exposure is therefore also considered to be negligible.

Predicted $PM_{2.5}$ Concentrations

6.6.23 Predicted annual mean $PM_{2.5}$ concentrations at the identified receptor locations are presented in .

6.6.24 Table 6.18 below.

Table 6.18 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m3)

Receptor	2027		Development Impact (as a % of the AQO)	Impact Significance
	Without Development	With Development		
R1	11.9	12.0	0.1	Negligible
R2	11.8	11.8	0.0	Negligible
R3	11.6	11.5	-0.1	Negligible
R4	11.4	11.4	-0.1	Negligible
R5	11.7	11.8	0.1	Negligible
R6	12.1	12.1	0.1	Negligible
R7	12.0	12.1	0.1	Negligible
R8	11.9	11.9	0.1	Negligible
R9	12.5	12.5	0.1	Negligible
R10	12.0	12.0	0.2	Negligible
R11	12.2	12.2	0.1	Negligible
R12	11.1	11.2	0.1	Negligible
R13	11.5	11.5	0.1	Negligible
R14	11.3	11.4	0.1	Negligible
R15	11.7	11.8	0.3	Negligible
R16	11.6	11.6	0.2	Negligible
R17	11.7	11.7	0.1	Negligible
R18	12.4	12.4	0.0	Negligible
R19	12.2	12.2	0.0	Negligible
R20	12.9	12.9	0.0	Negligible
R21	11.3	11.3	0.1	Negligible
R22	11.1	11.1	0.1	Negligible
R23	11.4	11.4	0.1	Negligible
R24	11.2	11.2	0.0	Negligible
R25	11.7	11.7	0.0	Negligible
ST1	11.4	11.5	0.2	-
ST2	11.4	11.4	0.1	-
D1	13.3	13.3	0.2	-
D2	11.4	11.6	0.8	-
D3	11.3	11.3	0.2	-

D4	11.0	11.0	0.0	-
D5	11.2	11.2	0.1	-

6.6.25 The results of the modelling assessment indicate that predicted annual mean $PM_{2.5}$ concentrations are well below (less than 75% of) the AQAL as the selected receptor locations both with and without the Proposed Development.

6.6.26 The Proposed Development is predicted to increase $PM_{2.5}$ concentrations by a maximum of 0.07µm^3 which equates to 0.3% of the AQAL. In accordance with the IAQM & EPUK significance criteria as set out in Table 6.8, the effect on local air quality with regards to this pollutant is considered to be negligible.

6.6.27 Within the site itself, annual mean $PM_{2.5}$ concentrations are predicted to fall below the relevant AQAL. The effect with regards to new exposure is therefore also considered to be negligible.

Airborne NOx Concentrations

6.6.28 An assessment of concentrations of NO_x at the nearby sensitive ecological sites has also been included, the results are presented in Table 6.19 below.

Table 6.19 Predicted Annual Mean NO_x Concentrations (µg/m^3)

Receptor	2027		Development Impact (as a % of the Critical Level)	Impact Significance
	Without Development	With Development		
E1	15.5	15.6	0.26	Insignificant
E2	16.4	16.4	0.05	Insignificant

6.6.29 The additional emissions arising from road traffic generated by the Proposed Development results in a relatively small change in predicted NOx concentrations at the ecological receptors.

6.6.30 At the SSSI (receptor E1), the change in concentrations of NOx is 0.26% of the Critical Level. Guidance provided by the EA suggests that an impact on such an ecological site can be considered to be insignificant if the change is less than 1% of the Critical Level. It should be noted that the receptor included in the model is at a worst-case location with regards to its proximity to the road and that the majority of the SSSI is located at a greater distance from the road where the impact will be reduced. The impact on the SSSI is therefore considered to be insignificant.

6.6.31 At the LNR, the guidance suggests that an impact would be insignificant if the change in NOx concentrations are less than 100% of the Critical Level. Therefore, at this location the impact is also considered to be insignificant.

Nitrogen Deposition

6.6.32 An assessment of nitrogen deposition at the SSSI as a result of the additional emissions from road vehicles generated by the operation of the Proposed Development has also been undertaken. The results of the assessment indicate that the additional road vehicles

result in an increase in the nitrogen deposition rate of 0.01kg/ha/yr at the worst case location within the SSSI. This represents less than 0.1% of the relevant worst case Critical Load. The impact of the increase in the nitrogen deposition rate as a result of the emissions from the additional traffic generated by the Proposed Development is therefore considered to be insignificant.

6.7 Mitigation and Residual Effects

Mitigation

Construction Phase

6.7.1 The control of dust emissions from construction-site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

6.7.2 A high risk of dust soiling impacts and a medium risk of human health (PM_{10}) effects is predicted at adjacent receptors during construction of the Proposed Development. Appropriate mitigation measures for the site have been identified following the IAQM guidance and based on the risk effects presented in Table 6.15. It is recommended that the 'highly recommended' measures set out below are incorporated into a Dust Management Plan (DMP) and approved by SCDC prior to commencement of any work on-site:

- develop and implement a stakeholder communications plan that includes community engagement before work commences on-site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- make the complaints log available to the local authority when asked;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- Hold regular liaison meetings with other high risk construction-sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised;
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to SCDC when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;
- agree dust deposition, dust flux or real-time PM_{10} continuous monitoring locations with the LA. Where possible commence baseline monitoring at least three months

before work commences on-site or, if it is a large site, before work on a phase commences;

- plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles;
- fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on-site. If being re-used on-site, cover as detailed below;
- cover, seed or fence stockpiles to prevent wind whipping;
- ensure all vehicles switch off engines when stationary - no idling vehicles;
- avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- impose and signpost a maximum speed limit of 15mph on surfaces and 10mph on un-surfaces haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- produce a construction logistic plan to manage the sustainable delivery of goods and materials;
- implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing);
- only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on-site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- use enclosed chutes and conveyors and covered skips;
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- ensure equipment is readily available on-site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- avoid bonfires and burning of waste materials;
- soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- avoid explosive blasting, using appropriate manual or mechanical alternatives;
- bag and remove any biological debris or damp down such material before demolition;

- re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- only remove the cover in small areas during work and not all at once;
- avoid scabbing (roughening of concrete surfaces) if possible;
- ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- inspect on-site haul routes for integrity and instigate necessary repairs to the surfaces as soon as reasonably practicable;
- record all inspections of haul routes and any subsequent action in a site log book;
- install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud);
- ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit; and
- access gates to be located at least 10m from receptors where possible.

6.7.3 In addition to the 'recommended' measures, the IAQM guidance also sets out a number of 'desirable' measures which should also be considered for inclusion within the DMP. These are also set out below.

- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Operational Phase

6.7.4 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ predicted at all of the receptors included in the assessment are below the relevant AQS objective levels and the impact on local air quality is predicted to be *negligible*. The concentrations predicted within the Development Site are also well below (less than 75%) of the relevant AQS objective levels. The effect on the sensitive ecological sites in terms of airborne NO_x concentrations and nitrogen deposition rates is considered to be insignificant. Therefore, no mitigation measures are considered necessary.

Residual Effects

Construction Phase

6.7.5 Following implementation of the measures recommended for inclusion within the DMP the impact of emissions during construction of the Proposed Development would be negligible.

Operational Phase

6.7.6 The effect of traffic associated with the Proposed Development on concentrations of NO_2, PM_{10} and $PM_{2.5}$ is predicted to be negligible and the effect on concentrations of airbourne NO_x and nitrogen deposition rates within the sensitive ecological sites is predicted to be insignificant. Residual effects are therefore also considered to be negligible / insignificant.

6.8 Summary of effects

6.8.1 An air quality impact assessment has been undertaken to assess both construction and operational effects associated with the Proposed Development.

6.8.2 An assessment of the potential effects during the construction phase identified that releases of dust and particulate matter are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases may be effectively mitigated and the resultant effects are considered to be negligible.

6.8.3 ADMS Roads dispersion modelling has been carried out to assess the operational effects associated with the Proposed Development. The results of the modelling indicate that concentrations of relevant pollutants (NO_2, PM_{10} and $PM_{2.5}$) will meet the relevant AQS objective levels at nearby sensitive receptors and within the site itself. The significance of the effects of the emissions arising from traffic associated with the operation of the Proposed Development is considered to be negligible.

6.8.4 The results of the modelling also indicate that the significance of the effects of the additional emissions arising from traffic associated with the operation of the Proposed Development on airborne NO_x and nitrogen deposition rates at the relevant sensitive ecological habitats is considered to be insignificant.

6.8.5 It is therefore considered that air quality does not pose any constraints to the development of the site as proposed.

6.9 References

Ref 6.1: Institute of Air Quality Management (2014); 'Guidance on the assessment of dust from demolition and construction version 1.1'.

Ref 6.2: Environmental Planning UK & Institute of Air Quality Management. Land-use Planning and Development Control: Planning for Air Quality, January 2017

Ref 6.3: http://uk-air.defra.gov.uk

Ref 6.4: D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.

Ref 6.5: Highways Agency, Transport Scotland, Welsh Assembly Government, The Department for Regional Development Northern Ireland. Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality

Ref 6.6: Habitats Directive AQTAG06. Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air.

Ref 6.7: Air Quality Directive 2008/50/EC

Ref 6.8: The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

Ref 6.9: The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

Ref 6.10: The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043

Ref 6.11: The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001

Ref 6.12: Department for Environment, Food and Rural Affairs (Defra), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16).

Ref 6.13: Communities and Local Government: *National Planning Policy Framework* (March 2012)

Ref 6.14: Suffolk Coastal District Local Plan. Core Strategy & Development Management Policies. Development Management Plan July 2013

Ref 6.15: Suffolk Coastal District Council Updating and Screening Assessment 2015

APPENDIX 6.1 (UPDATED)

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.

ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m^3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX 6.2 (UPDATED) – SUMMARY OF TRAFFIC DATA

The AADT flows were calculated based on numerous traffic surveys located adjacent to the site to provide peak hour flows. The AADT flows were calculated from the peak hour flows using peak to AADT factors obtained from the ATC.

Table 6.2.1: Traffic Data for 2015 Verification

Road Link	Description	Average Speed (mph)	2015 Verification and Baseline				
			AADT Traffic Flows	HDV (%)	Emission Rate (g/km/s)		
					NO_X	PM_{10}	$PM_{2.5}$
1	A12 north of roundabout with A1214	60	29423	15	0.203637	0.017957	0.010943
2a	A12 south of roundabout with A1214 (reduced speed approaching junction)	30	34270	15	0.285504	0.020912	0.012743
2b	A12 south of roundabout with A1214	60	34270	15	0.237183	0.020915	0.012745
2c	A12 south of roundabout with A1214 (reduced speed approaching roundabout with Anson Road)	25	34270	15	0.320013	0.021313	0.013124
3a	A12 south of roundabout with Anson Road (reduced speed approaching roundabout)	25	34270	15	0.320013	0.021313	0.013124
3b	A12 south of roundabout with Anson Road	60	34270	15	0.237183	0.020915	0.012745
3c	A12 south of roundabout with Anson Road (reduced speed approaching site access)	30	34270	15	0.285504	0.020912	0.012743
4a	A12 south of site access (reduced speed approaching junction)	30	34270	15	0.285504	0.020912	0.012743

4b	A12 south of site access	60	34270	15	0.237183	0.020915	0.012745
4c	A12 south of site access (reduced speed approaching roundabout with Newbourne Road)	30	34270	15	0.285504	0.020912	0.012743
5a	A12 south of roundabout with Newbourne Road (reduced speed approaching roundabout)	30	30596	15	0.254896	0.018670	0.011377
5b	A12 south of roundabout with Newbourne Road	60	30596	15	0.211755	0.018673	0.011379
6a	Main Road (reduced speed approaching roundabout with A12)	20	2886	10	0.025010	0.001626	0.001009
6b	Main Road	30	2886	10	0.019655	0.001559	0.000945
7	Newbourne Road	40	2276	10	0.013486	0.001208	0.000725
8a	A1214 Woodbridge Road (reduced speed approaching roundabout with A12)	20	10009	10	0.086737	0.005641	0.003498
8b	A1214 Woodbridge Road	40	10009	10	0.059306	0.005314	0.003188
9	A1071	30	12417	10	0.084567	0.006709	0.004065
10	Foxhall Road East	60	10167	5	0.051766	0.004893	0.002982
11	Foxhall Road West	40	10178	5	0.048030	0.004722	0.002817
12a	Bell Lane (reduced speed approaching junction with A1214)	15	2408	1	0.013108	0.001053	0.000648
12b	Bell Lane	30	2408	1	0.009810	0.000998	0.000596
13	Monument Farm Lane	30	431	0	0.001625	0.000173	0.000103

Table 6.2.2: Traffic Data for 2027 Do Minimum

Road Link	Description	Average Speed (mph)	2027 Do Minimum				
			AADT Traffic Flows	HDV (%)	Emission Rate (g/km/s)		
					NO_X	PM_{10}	$PM_{2.5}$
1	A12 north of roundabout with A1214	60	31390	15	0.061590	0.015824	0.008473
2a	A12 south of roundabout with A1214 (reduced speed approaching junction)	30	38203	15	0.074159	0.019389	0.010435
2b	A12 south of roundabout with A1214	60	38203	15	0.074957	0.019259	0.010312
2c	A12 south of roundabout with A1214 (reduced speed approaching roundabout with Anson Road)	25	38203	15	0.079711	0.019463	0.010506
3a	A12 south of roundabout with Anson Road (reduced speed approaching roundabout)	25	38203	15	0.079711	0.019463	0.010506
3b	A12 south of roundabout with Anson Road	60	38203	15	0.074957	0.019259	0.010312
3c	A12 south of roundabout with Anson Road (reduced speed approaching site access)	30	38203	15	0.074159	0.019389	0.010435
4a	A12 south of site access (reduced speed approaching junction)	30	38203	15	0.074159	0.019389	0.010435
4b	A12 south of site access	60	38203	15	0.074957	0.019259	0.010312
4c	A12 south of site access (reduced speed approaching roundabout with Newbourne Road)	30	38203	15	0.074159	0.019389	0.010435
5a	A12 south of roundabout with Newbourne Road (reduced speed approaching roundabout)	30	33545	15	0.065117	0.017025	0.009163

5b	A12 south of roundabout with Newbourne Road	60	33545	15	0.065818	0.016911	0.009054
6a	Main Road (reduced speed approaching roundabout with A12)	20	3496	10	0.007507	0.001611	0.000876
6b	Main Road	30	3496	10	0.006376	0.001596	0.000862
7	Newbourne Road	40	3822	10	0.006456	0.001737	0.000935
8a	A1214 Woodbridge Road (reduced speed approaching roundabout with A12)	20	10503	10	0.022552	0.004839	0.002633
8b	A1214 Woodbridge Road	40	10503	10	0.017741	0.004774	0.002570
9	A1071	30	14836	10	0.027057	0.006774	0.003660
10	Foxhall Road East	60	11975	5	0.021648	0.004828	0.002610
11	Foxhall Road West	40	11891	5	0.018859	0.004802	0.002599
12a	Bell Lane (reduced speed approaching junction with A1214)	15	2713	1	0.005616	0.001006	0.000555
12b	Bell Lane	30	2713	1	0.004375	0.000990	0.000540
13	Monument Farm Lane	30	515	0	0.000818	0.000183	0.000100

Table 6.2.3: Traffic Data for 2027 With Development

Road Link	Description	Average Speed (mph)	2027 Do Minimum				
			AADT Traffic Flows	HDV (%)	Emission Rate (g/km/s)		
					NO_X	PM_{10}	$PM_{2.5}$
1	A12 north of roundabout with A1214	60	33214	15	0.065169	0.016744	0.008965
2a	A12 south of roundabout with A1214 (reduced speed approaching junction)	30	39070	15	0.075842	0.019829	0.010672
2b	A12 south of roundabout with A1214	60	39070	15	0.076658	0.019696	0.010546
2c	A12 south of roundabout with A1214 (reduced speed approaching roundabout with Anson Road)	25	39070	15	0.081520	0.019905	0.010744
3a	A12 south of roundabout with Anson Road (reduced speed approaching roundabout)	25	39070	15	0.081520	0.019905	0.010744
3b	A12 south of roundabout with Anson Road	60	39070	15	0.076658	0.019696	0.010546
3c	A12 south of roundabout with Anson Road (reduced speed approaching site access)	30	39070	15	0.075842	0.019829	0.010672
4a	A12 south of site access (reduced speed approaching junction)	30	39070	15	0.075842	0.019829	0.010672
4b	A12 south of site access	60	39070	15	0.076658	0.019696	0.010546
4c	A12 south of site access (reduced speed approaching roundabout with Newbourne Road)	30	39070	15	0.075842	0.019829	0.010672
5a	A12 south of roundabout with Newbourne Road (reduced speed approaching roundabout)	30	34344	15	0.066668	0.017430	0.009381

5b	A12 south of roundabout with Newbourne Road	60	34344	15	0.067386	0.017313	0.009270
6a	Main Road (reduced speed approaching roundabout with A12)	20	3107	10	0.006671	0.001432	0.000779
6b	Main Road	30	3107	10	0.005666	0.001419	0.000766
7	Newbourne Road	40	9415	10	0.015903	0.004279	0.002304
8a	A1214 Woodbridge Road (reduced speed approaching roundabout with A12)	20	11870	10	0.025487	0.005469	0.002975
8b	A1214 Woodbridge Road	40	11870	10	0.020050	0.005395	0.002905
9	A1071	30	14914	10	0.027200	0.006809	0.003679
10	Foxhall Road East	60	12759	5	0.023065	0.005144	0.002781
11	Foxhall Road West	40	11960	5	0.018968	0.004830	0.002614
12a	Bell Lane (reduced speed approaching junction with A1214)	15	3859	1	0.007988	0.001430	0.000790
12b	Bell Lane	30	3859	1	0.006222	0.001408	0.000768
13	Monument Farm Lane	30	447	0	0.000710	0.000159	0.000087

APPENDIX 6.3 (UPDATED) – VERIFICATION AND ADJUSTMENT OF MODELLED CONCENTRATIONS

Nitrogen Dioxide (NO_2)

Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions. Verification of concentrations predicted by the ADMS model has followed the methodology presented in LAQM.TG(16).

The model has been run to predict annual mean road-NO_x concentrations at a diffusion tube monitoring site (MRT 1).

The model output of road-NOx (i.e. the component of total NO_x coming from road traffic) has been compared to the 'measured' road-NO_x (Table 6.3.1). The 'measured' road NO_x has been calculated from the measured NO_2 concentrations by using the Defra NO_x to NO_2 calculator available on the UK-AIR website.

Table 6.3.1: Comparison of Modelled and Monitored NOx concentrations

Monitoring Location	Total Monitored NO_2	Total Monitored NO_x	Background NO_2	Background NO_x	Monitored Road NO_x	Modelled Road NO_x	Ratio
MRT 1	24	39.2	14.1	19.7	9.9	19.5	1.94

An adjustment factor was determined as the ratio between the measured road-NOx contribution and the modelled road-NOx contribution (1.94). The adjustment factor was applied to the modelled road-NOx contribution prior to conversion to the annual mean NO_2 concentration using the Defra NO_x:NO_2 spread sheet calculation tool.

Particulate Matter (PM_{10} and $PM_{2.5}$)

There was insufficient roadside monitoring data available against which the modelling could be verified. Consequently, the road-PM_{10} and road-$PM_{2.5}$ contributions were adjusted using the factor obtained for NO_x concentrations, consistent with guidance provided in LAQM.TG(16).

APPENDIX 6.4 (UPDATED) - AIR QUALITY ASSESSMENT LEVELS

Air Quality Strategy Objective Levels			
Pollutant	**Standard ($\mu g/m^3$)**	**Averaging Period**	**No of Permitted Exceedences**
NO_2	200 (a)	1-Hour	18 per annum (99.8^{th} percentile)
	40 (a)	Annual	-
PM_{10}	200 (a)	24-Hour	35 per annum (90.4^{th} percentile)
	50 (a)	Annual	-
$PM_{2.5}$	25 (a)	Annual	-
(a) Air Quality Standards Regulations (2010) (b) EU Directive Limit Value			

Air Quality Strategy Critical Level		
Pollutant	**Standard ($\mu g/m^3$)**	**Critical Load (kg/N/ha/hr)**
NO_2	30	Annual

Critical Load		
Pollutant	**Habitat Type**	**Critical Load (kg/N/ha/hr)**
Nitrogen	Acid Grassland	8 to 15