AIR QUALITY ECOLOGICAL IMPACTS STATEMENT
NEWGATE LANE, FAREHAM

REC REFERENCE: AQ108582

REPORT PREPARED FOR: BARGATE HOMES AND FAREHAM LAND LP

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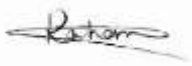
Signature				
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EXECUTIVE SUMMARY

Resource and Environmental Consultants (REC) Ltd was commissioned by Bargate Homes and Fareham Land LP to undertake an Air Quality Ecological Assessment in support of the proposed residential development at Newgate Lane, Fareham. Following comments received by Natural England (NE) an additional assessment is required to assess the potential impacts from road vehicles emissions associated with the proposed development on ecological designations in the vicinity of the site.

Due to the location of the proposed development, an Air Quality Ecological Impact Assessment was required in order to assess potential impacts on sensitive ecological receptors as a result of road traffic emissions associated with the operational phase of the development.

Dispersion modelling was undertaken in order to predict pollutant concentrations at ecological designations to predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the development and from other committed developments in the area. Results were subsequently verified using monitoring results obtained from Fareham Borough Council.

Impacts upon sensitive ecological designations as a result of emissions from the proposed development and in combination with other committed developments were deemed insignificant at all designations for 24 hour mean Nitrogen Oxide, annual mean Ammonia, annual mean acid deposition and annual mean nitrogen deposition.

Therefore, it is considered that impacts as a result of the development will be **not significant** on ecological designated sites**.**

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd was commissioned by for Bargate Homes and Fareham Land LP to undertake an Air Quality Ecological Impacts Assessment in support of the proposed residential development at Newgate Lane, Fareham.

Site Location and Context

The site is located at Newgate Lane, Fareham at approximate National Grid Reference (NGR): 457170, 103120. Reference should be made to Figure 1 within Appendix I for a location plan.

The proposals are comprised of 2 no. outline applications; P/18/1118/OA Land at Newgate Lane North (Fareham Land LP) and P/19/0460/OA Land at Newgate Lane South (Bargate Homes), the developments are to provide circa 190 residential dwellings alongside associated infrastructure and parking.

Due to the scale of the proposed development, an Air Quality Ecological Impact Assessment was required in order to assess potential impacts on sensitive ecological receptors as a result of road traffic emissions associated with the operational phase of the development.

1.2 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 LEGISLATION AND POLICY

2.1 European Legislation

European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$). The consolidated Directives include:

- Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 Habitats Directive

The Council Directive 92/43/EEC[1] was adopted in 1992 on the conservation of natural habitats and of wild fauna and flora aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements.

The Directive establishes the EU wide network of protected areas to be safeguarded against potentially damaging developments.

2.3 UK Legislation

The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[2]. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the

1 European Commission (1992), The Habitats Directive (92/43/EEC)
2 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

requirements for compliance vary slightly.

Table 1 presents the AQLVs for pollutants considered within this assessment.

Table 1 Critical Levels

Pollutant	Air Quality Limit Values	
	Concentration (µg/m^3)	Averaging Period
NO_x	30	Annual mean
	75	24-hour mean
NH_3	3	Annual mean for all higher plants
	1	Annual mean for sensitive lichen and bryophytes

Table 2 summarises the advice provided in DEFRA guidance LAQM (TG16)[3] on where the AQOs for pollutants considered within this report apply.

[3] Local Air Quality Management Technical Guidance 2016 LAQM (TG16), DEFRA, 2016.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.4 Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of administration under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.5 National Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework[4] (NPPF) was published on 24th July 2018 (updated in 19th February 2019) and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality*
>
> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

The implications of the NPPF have been considered throughout this assessment.

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The relevant air quality sections are highlighted below:

> Paragraph 001 states that: *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values" and "It is important that the potential impact of new development on air quality is taken into account, where the national assessment indicates that relevant limits have been exceeded or are near the limit". The role of Local Authorities under LAQM are stated and that Air Quality Action Plans should "identify measures that will be introduced in pursuit of the objectives"*
>
> Paragraph 005 states that "*Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development*

[4] National Planning Policy Framework, Department for Communities and Local Government, 2019.
[5] http://planningguidance.planningportal.gov.uk/.

is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation"

Paragraph 007 states that "*Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality". In terms of mitigation, it states that "Mitigation options where necessary will be location specific, will depend on the proposed development and should be proportionate to the likely impact"*

Paragraph 009 shows a flow chart highlighting how the assessment of air quality impacts should fit into the development management process. It makes it clear that air quality impact risks, AQLVs and AQOs should be considered in the decision-making process.

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.5.3 Local Planning Policy

The Fareham Metropolitan Borough Council (FMBC) Core Strategy[6] was adopted in September 2013 and is the current strategic local plan for the borough. The Core Strategy sets out the spatial vision and a range of strategic objectives and policies through to 2026.

A review of the Core Strategy indicated the following policy in relation to air quality that is relevant to this assessment:

"Policy CS4 17 - Green Infrastructure, Biodiversity and Geological Conservation

Habitats important to the biodiversity of the Borough, including Sites of Special Scientific Interest, Sites of Importance for Nature Conservation, areas of woodland, the coast and trees will be protected in accordance with the following hierarchy of nature conservation designation:

i) International - Special Protection Areas (SPA), Special Areas of Conservation (SAC) and RAMSAR;

(ii) National - Sites of Special Scientific Interest (SSSI) and National Nature Reserves;

(iii) Local - Sites of Importance for Nature Conservation (SINC), Local Nature Reserves (LNR), other Ancient Woodland not identified in (ii) above;and

(iv) Sites of Nature Conservation Value

[…]

In order to prevent adverse effects upon sensitive European sites in and around the Borough,

[6] Wigan Local Plan Core Strategy, Wigan Metropolitan Borough Council, 2013

the Council will work with other local authorities (including the Partnership for Urban South Hampshire) to develop and implement a strategic approach to protecting European sites from recreational pressure and development. This will include a suite of mitigation measures, with adequate provision of alternative recreational space for access management measures within and around the European sites and mitigation for impacts on air quality due to road traffic, supported by developer contributions where appropriate. Development likely to have an individual or cumulative adverse impact will not be permitted unless the necessary mitigation measures have been secured.

The Council will, through its Annual Monitoring Report, Local Air Quality Management and ongoing visitor surveys and related activities, scrutinise the effectiveness of the joint strategic approach to avoidance and mitigation of effects on European sites. It will adjust the rate, scale and/or distribution of housing or employment development across the Borough to respond to the findings of new evidence where appropriate, including the Solent Disturbance and Mitigation Project in order to preserve the integrity of European sites. Sites of geological importance will be protected and enhanced."

And

"CS7 - Development in Fareham

Development will be permitted within the Fareham settlement boundary where it contributes to one or more of the following

[..]

- *development of the Bus Rapid Transit South East Hampshire Harbour Link and improvements to air quality.*

Development will only be permitted where it does not significantly affect the setting and landscape character of the town or diminish the town's, community, historic, biodiversity and cultural resources nor have an adverse impact on air quality."

And

"CS14 – Development Outside Settlements

Built development on land outside the defined settlements will be strictly controlled to protect the countryside and coastline from development which would adversely affect its landscape character, appearance and function. Acceptable forms of development will include that essential for agriculture, forestry, horticulture and required infrastructure. The conversion of existing buildings will be favoured. Replacement buildings must reduce the impact of development and be grouped with other existing buildings, where possible. In coastal locations, development should not have an adverse impact on the special character of the coast when viewed from the land or water."

And

"CS12 - Daedalus Airfield Strategic Development Allocation

The Daedalus Airfield is allocated for strategic employment development. Development will be permitted where:

[...]

-it does not have an adverse impact on air quality"

CS16 - Natural Resources and Renewable Energy

New development will be expected to safeguard the use of natural resources by:

[...]

-Taking measures to reduce carbon emissions, pollution and waste during the construction and operation of new developments through orientation, layout, design and material selection"

A review of the Development Sites and Policies, adopted on June 2015, indicated the following policies in relation to air quality that are relevant to this assessment:

"DSP2: Environmental Impact

Development proposals should not, individually, or cumulatively, have a significant adverse impact, either on neighbouring development, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution (including dust, smoke, fumes or odour)."

And

"DSP 6 - New Residential Development Outside of the Defined Urban Settlement Boundaries

[...]

Proposals should have particular regard to the requirements of Core Strategy Policy CS14: Development Outside Settlements, and Core Strategy Policy CS6: The Development Strategy. They should avoid the loss of significant trees, should not have an unacceptable impact on the amenity of residents, and should not result in unacceptable environmental or ecological impacts, or detrimental impact on the character or landscape of the surrounding area.

"***DSP56: Renewable Energy***

[...]

Proposals for renewable and low carbon energy development should ensure that there are no significant negative impacts upon:

iv) The amenity (including air quality, waste and noise) of local residents and businesses"

A review of the Welborne Plan, adopted on June 2015, indicated the following policy in relation to air quality that is relevant to this assessment:

"*WEL6: General Design Principles*

The following are the design principles which will guide the future development of Welborne. All proposals for the development of Welborne shall clearly demonstrate how:

[...]

v) The issues of noise, light pollution and air quality have been considered in developing proposals, and shall set out the measures necessary to mitigate any likely impacts."

Reference has been made to these policies during the undertaking of this Air Quality Assessment by assessing pollutant concentrations across the development and determining potential air quality impacts from the operation of the proposed development.

3.0 METHODOLOGY

The development may have the potential to impact on existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. The following assessment was therefore undertaken using the criteria contained within IAQM guidance[7] to determine the potential for trips generated by the development to affect local ecological sites. The IAQM guidance[7] document states the following methodology to help establish when an air quality assessment is likely to be considered necessary. The methodology is split into the following three sections:

- Scoping;
- Quantification; and
- Screening.

3.1 Scoping

A desktop study is conducted to identify sensitive ecological receptors which fall within 200m of the road network which is likely to be used by traffic associated with the proposed development. If all ecological sites fall outside of the 200m buffer then no further action is required and the site should not be assessed further. Reference should be made to Figure 3 for geographical representative of roads with ecological sites within 200m.

If potential impacts of the site have not been screened out using the above criteria, the risk of impact should next be assessed based on AADT or air quality impacts. It is considered that traffic impacts can be screened out if predicted AADT traffic flows from cumulate developments are predicted to cause increases of less than 1000 AADT or 200 HDVs within 200m of ecological sites. It should be noted that where cumulative traffic counts are unavailable, potential impacts will not be screened out by this step even if the site results in increased traffic flows of less than 1000 AADT or 200 HDVs.

3.2 Quantification

Detailed dispersion modelling was undertaken to quantify NO_2 and NH_3 concentrations/depositions ecological designations using the following scenarios:

- 2017 Verification;
- Process contribution (PC) - the change in pollutant concentration/deposition as a result of the proposal; and
- Predicted Environmental Concentration (PEC) - the addition of baseline / background concentrations/depositions to the PC including in-combination effects.

The traffic data used to assess the in-combination effects for the PEC on the ecological sites, include the following developments;

- Stubbington Bypass
- Land at Old Street, Stubbington (P/17/1451/OA)
- Newlands Farm, Fareham (P15/1279/OA)
- Daedalus Development

[7] IAQM A Guide to the Assessment of Air Quality impacts on Designated Nature Conservation Sites

Further information regarding the traffic data used within this assessment can be shown within the Assessment Input within Appendix II.

3.3 Detailed Assessment

For each modelled habitat within each site, the PC is calculated as a percentage of the relevant critical load / level for the site alone and where possible in combination with cumulative developments. Impacts can be considered insignificant if the modelled PC is less than 1% of the environmental standard for relevant ecological habitat.

Should these criteria be exceeded then the PEC should be calculated and assessed against the standard for ecological habitat. If the predicted PC is greater than 1% and the PEC is less than 70% of the environmental standard, the emissions can be considered insignificant. Should the predicted PEC be greater than 70% of the environmental standard, detailed dispersion modelling should be produced and a specialist ecologist consulted to determine likely significance.

4.0 ASSESSMENT

Predicted concentrations and deposition rates of each pollutant at the ecological receptor locations identified in Table 3 are summarised in the following Sections based on IAQM guidance[7].

4.1 Scoping

As indicated In Figure 2 within Appendix I there is one ecological receptors locations in proximity to affected roads of the proposed development site; Portsmouth Harbour. This ecological designation has the potential to be impacted at the following four main locations as a result of the road traffic generated by the development and other committed developments:

- Delme Roundabout (A27 at Cams Hill);
- A27 by Paulsgrove Lake; and
- A32 Gosport Road.

These locations have been considered further within this assessment.

Through a combination of ecological boundaries accessed via MAGIC, accurate designated area has been assessed. Table 3 provides detail of the ecological receptors considered within this assessment. Reference should be made to Figure 2 and Figures 4 to Figure 6 for a graphic representation of the receptor points chosen to represent each site.

Table 3 Ecological Receptors

Ecological Receptor		Designation	Distance from Site (m)	NGR (m)	
				X	Y
E1	Portsmouth Harbour	Ramsar, SSSI and SPA	3,304	458,645	106,200
E2	Portsmouth Harbour	Ramsar, SSSI and SPA	3,346	458,684	106,227
E3	Portsmouth Harbour	Ramsar, SSSI and SPA	3,359	458,717	106,225
E4	Portsmouth Harbour	Ramsar, SSSI and SPA	3,372	458,772	106,210
E5	Portsmouth Harbour	Ramsar, SSSI and SPA	2,605	457,863	105,756
E6	Portsmouth Harbour	Ramsar, SSSI and SPA	2,640	457,875	105,789
E7	Portsmouth Harbour	Ramsar, SSSI and SPA	2,703	457,929	105,838
E8	Portsmouth Harbour	Ramsar, SSSI and SPA	2,746	457,968	105,872
E9	Portsmouth Harbour	Ramsar, SSSI and SPA	2,794	457,993	105,914
E10	Portsmouth Harbour	Ramsar, SSSI and SPA	2,550	457,868	104,517

The development is predicted to generate 100 AADT with no HDVs. As such, roads which are predicted to experience increases in traffic flows associated with the development are not expected to experience changes of over 1,000 AADT or 200 HDVs. Predicted traffic flows for cumulative

developments are unavailable and as such the risk of impact from the development is unable to be screened out. Potential impacts as a result of the development have been considered further.

4.2 Quantification

Critical loads have been designated within the UK based on the sensitivity and relevant features of the receiving habitat. A review of the Air Pollution Information System (APIS) website[8] was undertaken in order to identify the relevant nitrogen critical load class and associated critical load for the designations considered within the model. The critical loads and background deposition rates for nitrogen deposition are detailed in Table 4.

Table 4 Nitrogen Critical Load

Ecological Receptor	Feature	Nitrogen Critical Load (kgN/ha/yr)		Nitrogen Deposition Rate	NH3 Critical Load (kgN/ha/yr)
		Min	Max		
E1	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E2	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E3	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E4	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E5	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E6	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E7	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E8	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3

[8] UK Air Pollution Information System, www.apis.ac.uk.

Ecological Receptor	Feature	Nitrogen Critical Load (kgN/ha/yr)		Nitrogen Deposition Rate	NH3 Critical Load (kgN/ha/yr)
		Min	Max		
E9	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3
E10	Pioneer, low-mid, mid-upper saltmarshes	20	30	14.6	3

It should be noted that the habitats shown in Table 4 are considered to be the most representative and sensitive within each designation for nitrogen deposition in that area.

Table 5 shows the relevant critical loads and background deposition rates for acid deposition.

Table 5 Acid Critical Load

Ecological Receptor	Feature	Acid Critical Load (kgN/ha/yr)			Acid deposition (kgN/ha/yr)	
		CLMaxs	CLMaxs	CLMaxs	N	S
E1	Calcareous grassland	4	0.856	4.856	1.00	0.3
E2	Calcareous grassland	4	0.856	4.856	1.00	0.3
E3	Calcareous grassland	4	0.856	4.856	1.00	0.3
E4	Calcareous grassland	4	0.856	4.856	1.00	0.3
E5	Calcareous grassland	4	0.856	4.856	1.00	0.3
E6	Calcareous grassland	4	0.856	4.856	1.00	0.3
E7	Calcareous grassland	4	0.856	4.856	1.00	0.3
E8	Calcareous grassland	4	0.856	4.856	1.00	0.3
E9	Calcareous grassland	4	0.856	4.856	1.00	0.3
E10	Calcareous grassland	4	0.856	4.856	1.00	0.3

Table 6 shows the development PC to concentrations and deposition rates at the representative ecological receptor locations.

Table 6 Process Contributions at Receptor Locations

Ecological Receptor	Annual mean NO_2 (µg/m3)	24 Hour Mean NO_2 (µg/m3)	Annual Mean NH_3 (µg/m3)	Annual mean NO_2 Deposition (kg N/ha/yr)	Annual Mean Acid Deposition Rate (keq/ha/yr)
E1	0.000	0.10	0.001	0.01	0.0004
E2	0.100	0.20	0.002	0.02	0.0018
E3	0.100	0.20	0.002	0.02	0.0018
E4	0.000	0.20	0.002	0.01	0.0007
E5	0.100	0.40	0.003	0.03	0.0021
E6	0.100	1.00	0.004	0.04	0.0025
E7	0.200	1.00	0.005	0.05	0.0039
E8	0.200	0.00	0.005	0.05	0.0039
E9	0.100	0.00	0.000	0.01	0.0010
E10	0.040	0.10	0.002	0.02	0.0012

4.3 Screening

Annual Mean Oxides of Nitrogen

Predicted annual mean NO_x concentrations for sensitive ecological receptors are summarised in Table 7. It should be noted that the results presented in Table 7 represent the maximum concentrations predicted across all meteorological datasets.

Table 7 Predicted Annual Mean NO_x Concentrations

Receptor	Predicted Annual Mean NO_x Concentration (µg/m^3)	Proportion of EQS (%)
	PC	PC
E1	0.000	0.00
E2	0.100	0.33
E3	0.100	0.33
E4	0.000	0.00

Receptor	Predicted Annual Mean NO_x Concentration ($\mu g/m^3$)	Proportion of EQS (%)
	PC	PC
E5	0.100	0.33
E6	0.100	0.33
E7	0.200	0.67
E8	0.200	0.67
E9	0.100	0.33
E10	0.040	0.13

As indicated in Table 7, at all 23 ecological receptor locations, the PC remained below 1% of the EQS and as such can be considered **insignificant** in accordance with the EA screening criteria and IAQM Guidance.

24-Hour Mean Oxides of Nitrogen

Predicted 24-hour mean NO_x concentrations for sensitive ecological receptors are summarised in Table 8. It should be noted that the results presented in Table 8 represent the maximum concentrations predicted across all meteorological datasets.

Table 8 Predicted 24-hour Mean NO_x Concentrations

Receptor	Predicted 24-hour Mean NO_x Concentration ($\mu g/m^3$)	Proportion of EQS (%)
	PC	PC
E1	0.10	0.13
E2	0.20	0.27
E3	0.20	0.27
E4	0.20	0.27
E5	0.40	0.53
E6	1.00	1.33
E7	1.00	1.33
E8	0.00	0.00
E9	0.00	0.00
E10	0.10	0.13

As indicated in Table 8, predicted 24-hour mean NO_x PC proportion of the EQS is less than 1% at all

receptor locations. As such, impacts on 24-Hour mean NO_x concentrations are considered to be **insignificant** in accordance with the EA screening criteria and IAQM guidance.

Ammonia – NH_3

Predicted annual mean HN_3 concentrations for sensitive ecological receptors are summarised in Table 9. It should be noted that the results presented in Table 9 represent the maximum concentrations predicted across all meteorological datasets.

Table 9 Predicted Annual Mean NH_3 Concentrations

Receptor	Predicted Annual Mean NO_x Concentration ($\mu g/m^3$)	Proportion of EQS (%)
	PC	PC
E1	0.001	0.03
E2	0.002	0.07
E3	0.002	0.07
E4	0.002	0.07
E5	0.003	0.10
E6	0.004	0.13
E7	0.005	0.17
E8	0.005	0.17
E9	0.000	0.00
E10	0.002	0.07

As indicated in Table 9, the predicted annual mean NH_3 PC remains below 1% of the relevant long term EQS at all sensitive receptor locations, As such, impacts on annual mean NH_3 concentrations are considered to be **insignificant** in accordance with the EA screening criteria and IAQM guidance.

Nitrogen Deposition

Predicted annual mean nitrogen deposition rates are summarised in Table 10. Reference should be

made to Table 4 for details of the site-specific Low and High EQSs.

Table 10 Predicted Annual Mean Nitrogen Deposition Rates

Receptor	Predicted Annual Mean Nitrogen Deposition Rate (kgN/ha/yr)	Proportion of EQS (%)	
	PC	Low EQS	High EQS
		PC	PC
E1	0.01	0.03	0.02
E2	0.02	0.17	0.10
E3	0.02	0.17	0.10
E4	0.01	0.07	0.04
E5	0.03	0.20	0.12
E6	0.04	0.23	0.14
E7	0.05	0.37	0.22
E8	0.05	0.37	0.22
E9	0.01	0.10	0.06
E10	0.02	0.11	0.06

As indicated in Table 10, the PC proportion of the EQS is less than 1% for receptor locations. As such, impacts on nitrogen deposition at these locations are considered to be **insignificant** in accordance with EA screening criteria[9] and IAQM guidance.

Acid Deposition

Predicted acid deposition rates are summarised in Table 11. It should be noted all results relate to the maximum predicted by any meteorological dataset. It should also be noted that the acid deposition rate for sulphur is the background deposition rate only, as sulphur is not emitted by the proposed installation.

Table 11 Predicted Annual Mean Acid Deposition Rates

Receptor	Predicted Annual Mean Acid Deposition Rate (keq/ha/yr)		Proportion of EQS (%)		Exceedance of CL Function (keq/ha/yr)
	PC	PEC	PC	PEC	
E1	0.0004	1.3004	0.01	26.78	None

[9] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

Receptor	Predicted Annual Mean Acid Deposition Rate (keq/ha/yr)		Proportion of EQS (%)		Exceedance of CL Function (keq/ha/yr)
	PC	PEC	PC	PEC	
E2	0.0018	1.3018	0.04	26.81	None
E3	0.0018	1.3018	0.04	26.81	None
E4	0.0007	1.3007	0.02	26.79	None
E5	0.0021	1.3021	0.04	26.82	None
E6	0.0025	1.3025	0.05	26.82	None
E7	0.0039	1.3039	0.08	26.85	None
E8	0.0039	1.3039	0.08	26.85	None
E9	0.0010	1.3010	0.02	26.79	None
E10	0.0012	1.3012	0.02	26.79	None

The PC proportion of the EQS is less than 1% at all 10 receptor locations. As such, impacts on annual mean nitrogen deposition rates can be screened out as **insignificant** in accordance with the EA screening criteria and IAQM guidance at these locations. However the APIS site relevant critical load tool[8] indicated that no receptors exceeded the CL function for acid deposition and as such impacts can be classified as **not significant**.

5.0 CONCLUSION

Impacts upon sensitive ecological designations as a result of emissions from the proposed development were inconsequential and could be screened out as insignificant. Therefore all impacts were deemed **not significant** at all designations for annual and 24 hour mean NO_x, annual mean NH_3, annual mean nitrogen deposition and acid deposition.

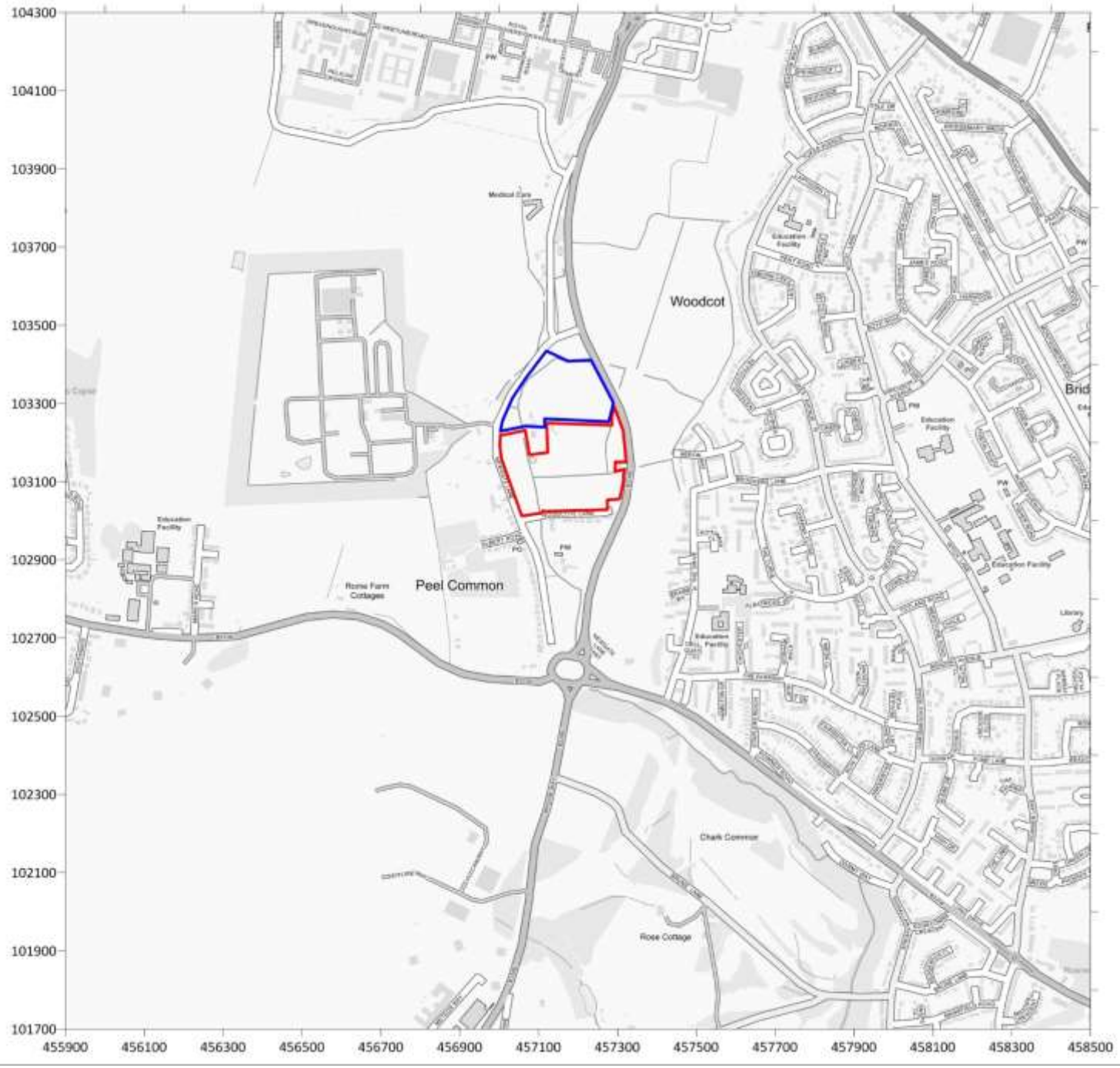
Furthermore, at receptors along the M27, the maximum PC predicted for annual mean NO_x, 24-hour mean NO_x, NH_3 and Nitrogen deposition all remain well below 1% of the relevant EQS and Acid Deposition is predicted to be not significant. As such, ecological designations further away, such as the Portsmouth Harbour site, is not predicted to experience a PC greater than 1% and as such impacts should be considered not significant.

Based on the assessment results, no further assessment is required to investigate impacts as a result of traffic generation from the proposed development on ecological receptors.

ABBREVIATIONS

%ile	Percentile
APIS	Air Pollution Information System
DEFRA	Department for Environment, Food and Rural Affairs
EQS	Environmental Quality Standard
EU	European Union
FBC	Fareham Borough Council
LA	Local Authority
LAQM	Local Air Quality Management
LNR	Local Nature Reserve
MAGIC	Multi-Agency Geographic Information for the Countryside
NE	Natural England
NGR	National Grid Reference
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PC	Process Contribution
PEC	Predicted Environmental Concentration
REC	Resource and Environmental Consultants
SAC	Special Areas of Conservation

APPENDIX I FIGURES



Legend

Site Boundary (Southern Parcel)

Site Boundary (Northern Parcel)

Title

Figure 1

Site Location

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

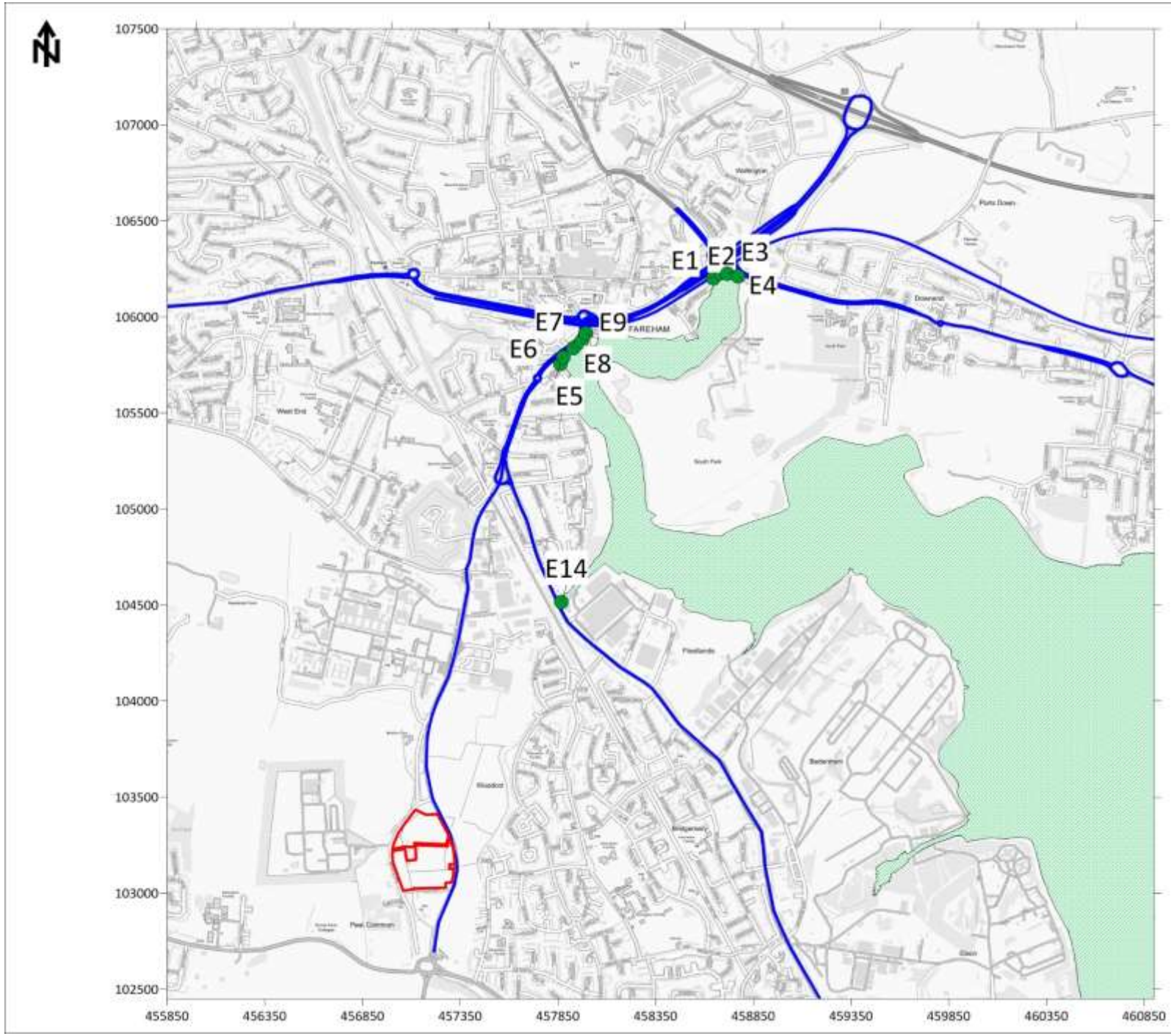
Project Number

AQ108582

Client

Bargate Homes and Fareham Land LP

REC
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

- Site Boundary
- Modelled Road Link
- Cartesian Grid
- Sensitive Receptor Location
- Ecological Location

Title

Figure 2

ADMS-Roads Inputs and Site Context

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

Project Number

AQ108582

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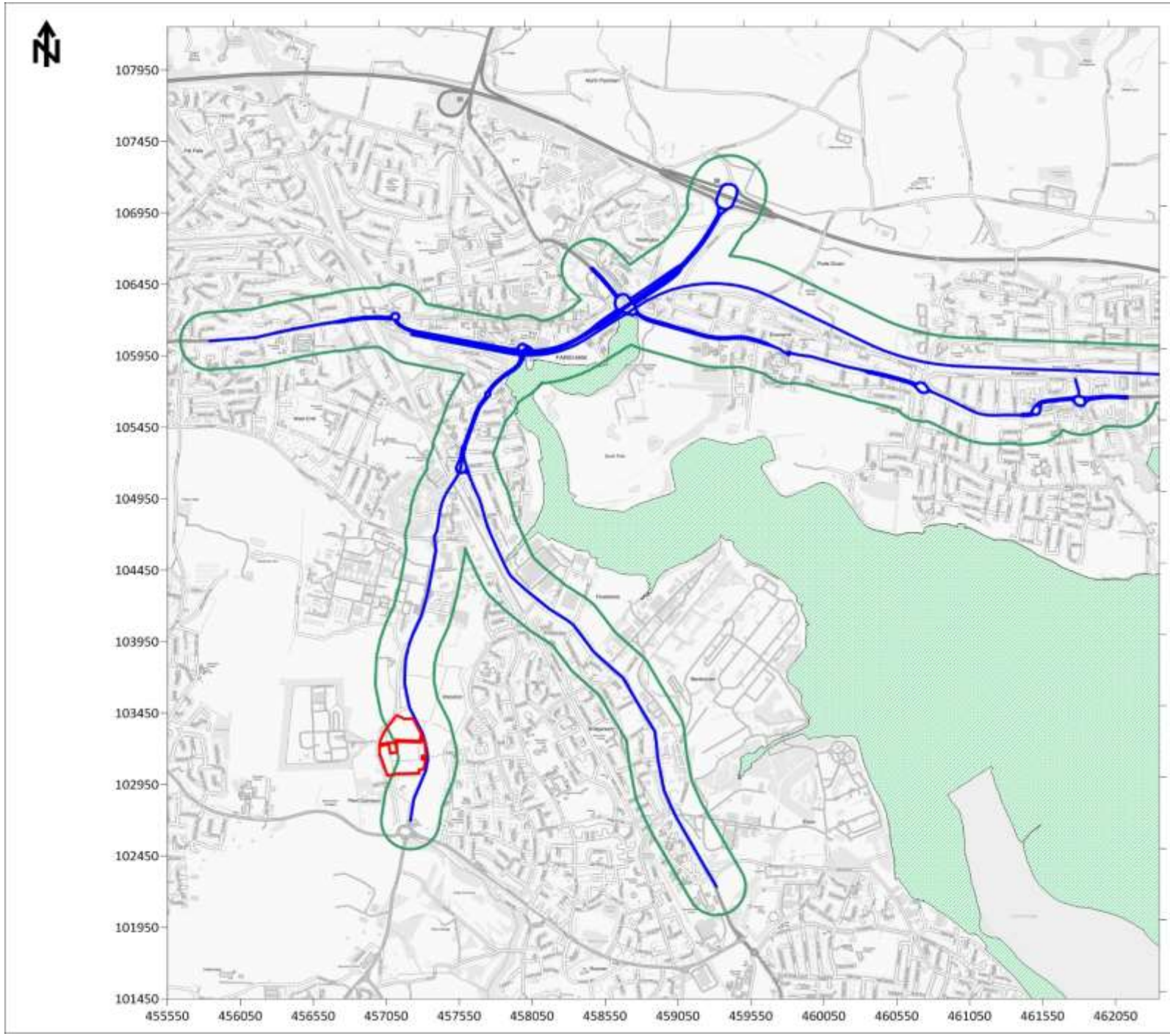

Legend

- Site Boundary
- Modelled Road Link
- Cartesian Grid
- Sensitive Receptor Location
- Ecological Location

Title

Figure 3

Road Impact Buffer

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

Project Number

AQ108582

Client

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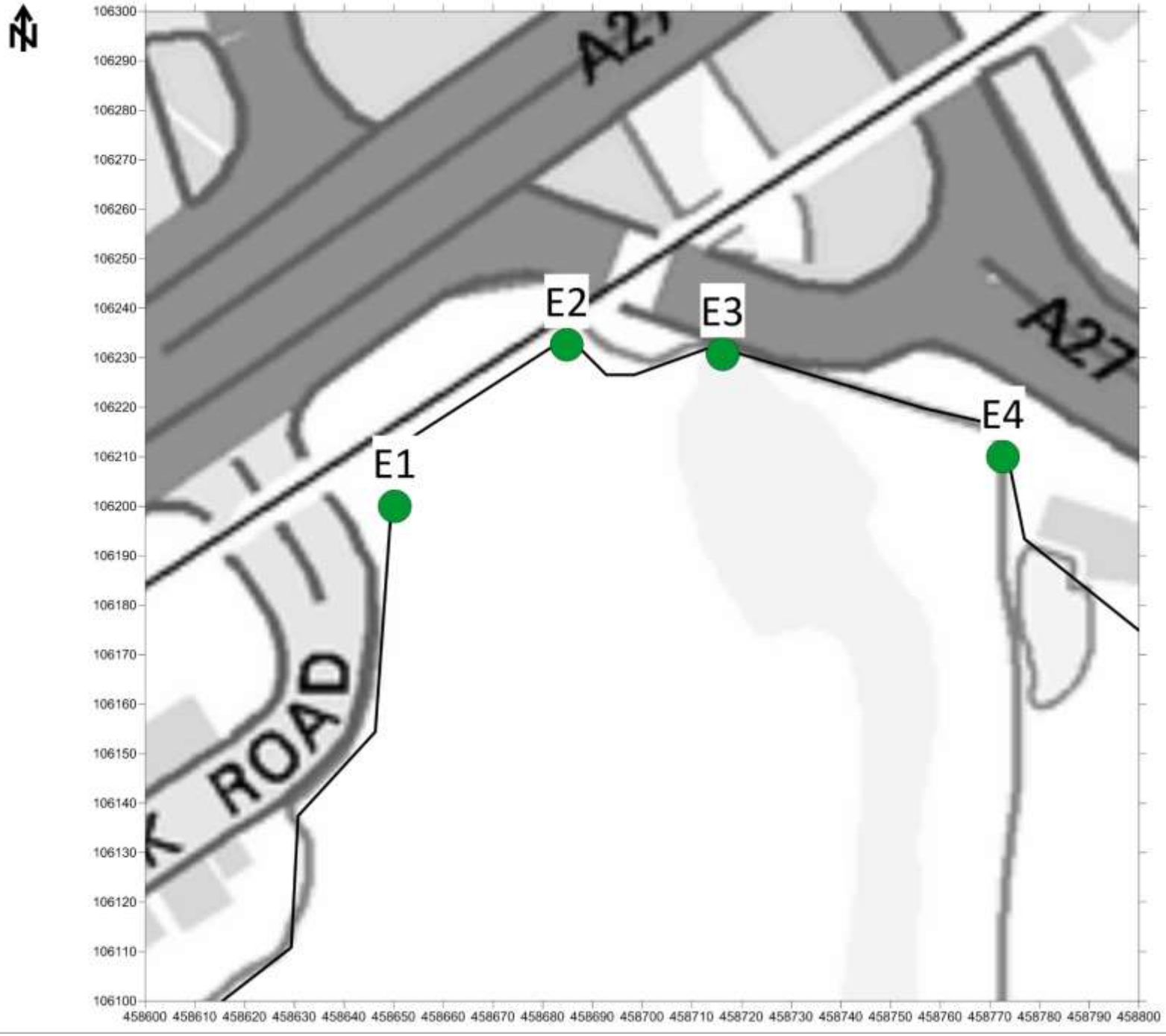

Legend

Ecological Boundary

Ecological Receptor Location

Title

Figure 4

Ecological Receptor Locations
Site 1

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

Project Number

AQ108582

Client

Bargate Homes and Fareham Land LP

REC
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Osprey House, Broadway, Manchester M50 2UE
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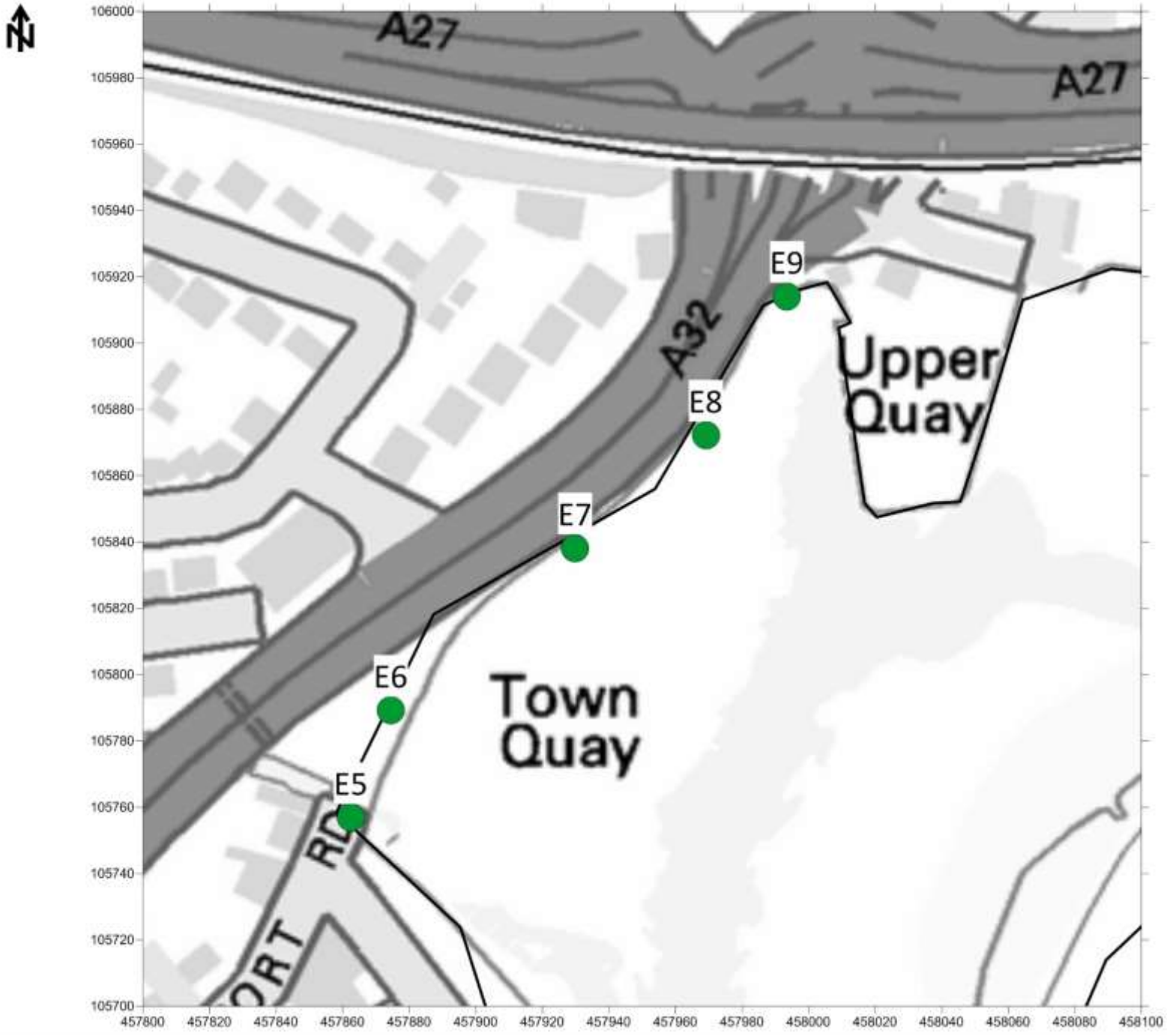

Legend

Ecological Boundary

Ecological Receptor Location

Title

Figure 5

Ecological Receptor Locations
Site 2

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

Project Number

AQ108582

Client

Bargate Homes and Fareham Land LP

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Legend

Site Boundary

Ecological Receptor Location

Title

Figure 6

Ecological Receptor Locations
Site 3

Project

Air Quality Ecological Impact Assessment
Newgate Lane, Fareham

Project Number

AQ108582

Client

Bargate Homes and Fareham Land LP

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APPENDIX II ASSESSMENT INPUTS

Assessment Inputs

The proposed development has the potential to exposure future site users to elevated pollution levels as well as impact air quality at existing sensitive receptor locations. Dispersion modelling using ADMS Roads was therefore undertaken to predict NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations both with and without the development in order to consider potential changes as a result of the proposals.

The dispersion model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length; and
- Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS Roads dispersion model (version 4.0.1.0). ADMS Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Assessment Area

Ambient concentrations were predicted at specific representative sensitive receptor locations. A height of 0m was used within the model to represent concentrations at ground level.

Reference should be made to Figure 2 within Appendix I for a graphical representation of the assessment extents.

Traffic Flow Data

Traffic data for use in the assessment, including development flows, was provided by Pegasus Group, the Transport Consultant for the project.

The provided data included baseline flows for roads directly in the vicinity of the site. As such, 24-hour flows and fleet composition for all other roads were downloaded from the Department for Transport (DfT) Matrix. The DfT Matrix web tool enables the user to view and download traffic flows on every link of the A-road and motorway network in Great Britain for the years 1999 to 2018. It should be noted that the DfT matrix is referenced in DEFRA guidance LAQM (TG16)[3] as being a suitable source of data for air quality assessments and is therefore considered to provide a good representation of traffic

flows in the vicinity of the site.

Growth factors provided by the Trip End Model Presentation Program (TEMPRO) software package were utilised to allow for conversion from the obtained 2017 traffic flow year to 2024, which was used to represent the development opening year.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 6 within Appendix I for a graphical representation of the road link locations. A summary of the traffic data used in the verification scenarios is provided in Table AII.1.

Table AII.1 2017 Traffic Data

Road Link		Road Width (m)	Canyon Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
1	A27 Roundabout	10.0	0.00	59,489	2.29	24
2	A27 - S of M27 S bound	11.0	0.00	29,745	2.29	89
3	A27 - S of slip to Delme S bound	7.0	0.00	29,745	2.29	89
4	A27 - S of Delme S bound	7.0	0.00	29,476	3.32	48
5	A27 - S of slip to Delme S bound	7.0	0.00	29,476	3.32	48
6	A27 - S of M27 N bound	10.5	0.00	29,745	2.29	32
7	A27 - N of slip from Delme N bound	10.5	0.00	29,745	2.29	89
8	A27 - S of slip from Delme N bound	6.5	0.00	29,476	3.32	89
9	A27 - N of slip to Delme N bound	6.5	0.00	29,476	3.32	48
10	A27 - S of slip to Delme N bound	6.5	0.00	29,476	3.32	48
11	Delme Roundabout	8.5	0.00	30,493	1.80	24
12	A27 Slip from A27 W bound	6.5	0.00	5,949	2.29	72
13	A27 Slip to Delme Roundabout W bound	6.5	0.00	5,949	2.29	24
14	A27 Slip from Delme Roundabout E bound	6.0	0.00	5,949	2.29	72
15	A27 Slip to Delme Roundabout E bound	6.0	0.00	5,895	3.32	24
16	A27 Slip from A27 E bound	6.0	0.00	5,895	3.32	72
17	A27 Slip from Delme Roundabout W bound	6.0	0.00	5,895	3.32	72
18	Wallington Way S bound	7.0	0.00	9,352	4.00	16
19	Wallington Way S bound	7.0	0.00	9,352	4.00	48
20	Wallington Way N bound	7.5	0.00	9,352	4.00	48

Road Link		Road Width (m)	Canyon Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
21	Cams Hill - E of Delme E bound	7.5	0.00	15,247	1.80	24
22	Cams Hill - W of Cams Hall E bound	10.0	0.00	15,247	1.80	16
23	Cams Hill - E of Cams Hall E bound	7.0	0.00	15,247	1.80	48
24	Cams Hill - W of Downend Road E bound	7.0	0.00	13,885	2.01	16
25	Portchester Road - E of Downend Road E bound	7.0	0.00	10,797	2.62	48
26	Cams Hill - E of Delme W bound	6.5	0.00	15,247	1.80	16
27	Cams Hill - W of Cams Hall W bound	6.5	0.00	15,247	1.80	24
28	Cams Hill - E of Cams Hall W bound	7.0	0.00	13,885	2.01	16
29	Cams Hill - W of Downend Road W bound	7.0	0.00	13,885	2.01	48
30	Portchester Road - E of Downend Road W bound	8.0	0.00	10,797	2.62	48
31	Portchester Road - W of Portchester roundabout	13.0	0.00	21,595	2.62	48
32	Portchester Road - W of Portchester roundabout	13.0	0.00	21,595	2.62	16
33	Portchester Roundabout	7.5	0.00	21,595	2.62	16
34	Portchester Road - E of Portchester roundabout	13.0	0.00	21,758	2.62	16
35	Portchester Road - W of Beauliea Ave	13.0	0.00	21,758	2.62	48
36	Portchester Road - E of Beauliea Ave	12.0	0.00	21,758	2.62	48
37	Portchester Road - W of Cornaway Lane roundabout E bound	6.0	0.00	10,929	2.67	48
38	Portchester Road - W of Cornaway Lane roundabout E bound	6.5	0.00	10,929	2.67	16
39	Portchester Road - W of Cornaway Lane roundabout W bound	6.5	0.00	10,929	2.67	48
40	Cornaway Lane Roundabout	6.0	0.00	21,858	2.67	16
41	West street - E of Cornaway Lane Roundabout	11.0	0.00	15,857	2.10	16
42	west street - W of Downsway	11.0	0.00	15,857	2.10	32
43	West street - W of West Street Roundabout E bound	6.0	0.00	7,929	2.10	16
44	West street - W of West Street Roundabout W bound	6.0	0.00	7,929	2.10	16

Road Link		Road Width (m)	Canyon Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
45	West Street Roundabout	7.5	0.00	17,065	2.01	16
46	West street - E of West street roundabout E bound	6.5	0.00	8,533	2.01	32
47	West street - W of Castle Street roundabout E bound	6.5	0.00	8,533	2.01	16
48	West street - E of West street roundabout W bound	6.5	0.00	8,533	2.01	16
49	West street - W of Castle Street roundabout W bound	6.5	0.00	8,533	2.01	32
50	Castle Street Roundabout	7.5	0.00	22,225	2.09	16
51	East street - E of Castle street Roundabout E bound	6.5	0.00	11,113	2.09	32
52	East Street - W of Murrills Estate E bound	6.5	0.00	11,113	2.09	16
53	East Street - E of Murrills Estate E bound	8.0	0.00	11,113	2.09	16
54	East street - E of Castle street Roundabout W bound	6.5	0.00	11,113	2.09	16
55	East street - E of Castle street Roundabout W bound	6.5	0.00	11,113	2.09	32
56	East Street - E of Murrills Estate W bound	6.0	0.00	11,113	2.09	16
57	on site	4.0	0.00	0	0.00	16
58	trainline	5.0	0.00	0	0.00	72
59	trainline	5.0	0.00	0	0.00	72
60	Eastern/Western Way bridge	4.2	0.00	15,250	2.32	48
61	Eastern Way onto A32 South	10.4	0.00	30,500	2.32	16
62	Eastern Way exiting Roundabout	6.8	0.00	30,500	2.32	16
63	Western Way Westbound	6.7	0.00	6,176	2.52	48
64	Western Way Slowdown onto Roundabout	10.1	0.00	6,176	2.52	16
65	A32 approaching juction to left	4.1	0.00	13,225	2.60	16
66	A27 exiting roundabout onto Western Way	4.6	0.00	4,117	2.52	16
67	A32 Roundabout Approach	7.2	0.00	13,225	2.60	16
68	Eastern Way onto A32 Southbound	3.6	0.00	13,225	2.60	16

Road Link		Road Width (m)	Canyon Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
69	Roundabout exit onto A27	7.5	0.00	15,250	2.32	16
70	Gosport Road Junction	9.6	0.00	63,835	1.62	16
71	Western Way, Westbound	7.0	0.00	6,176	2.52	48
72	A32 Southbound	6.9	0.00	26,451	2.60	32
73	Old Gosport Road Slowdown	5.2	0.00	26,451	2.60	16
74	Gosport Road Exit	7.2	0.00	26,451	2.60	16
75	Gosport Road Exit North of Old Gosport Road	7.8	0.00	26,451	2.60	16
76	Gosport Road North of Old Gosport Road	6.8	0.00	26,451	2.60	32
77	Old Gosport Road Roundabout Approach Northbound	6.8	0.00	26,451	2.60	16
78	Old Gosport Road Roundabout	10.0	0.00	39,676	3.46	16
79	Gosport Road South, Southbound	6.5	0.00	26,451	2.60	32
80	Slowdown onto Newgate Lane Junction	7.3	0.00	26,451	2.60	16
81	A32	8.6	0.00	27,452	3.21	16
82	Gosport Road South, Northbound	7.3	0.00	26,451	2.60	32
83	Newgate Lane, Merge, North	3.8	0.00	13,225	2.60	16
84	Access Road	7.0	0.00	13,225	2.60	16
85	Newgate Lane	6.5	0.00	13,225	2.60	32
86	A32 onto Gosport Road Loop	6.4	0.00	13,726	3.21	16
87	Gosport Road Traffic Lights	11.4	0.00	27,452	3.21	16
88	A32/Gosport Road	7.2	0.00	27,452	3.21	32
89	Gosport A27 roundabout	8.0	0.00	7,661	3.00	24
90	Gosport A27 Eastbound Speed Up	6.5	0.00	7,661	3.00	24
91	Gosport A27 Westbound Slow Down	10.6	0.00	7,661	3.00	16
92	Gosport A27 Westbound Speed Up	10.6	0.00	7,661	3.00	24
93	Gosport A27 Eastbound Slow Down	6.9	0.00	7,661	3.00	16
94	Gosport A27 Eastbound	6.9	0.00	7,661	3.00	48

Road Link		Road Width (m)	Canyon Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
95	Gosport A27 Westbound	7.5	0.00	7,661	3.00	48
96	The Avenue A27	13.3	0.00	15,322	3.00	48

The road width and mean vehicle speed shown in Table All.1 remained the same for 2024. A summary of the 2024 traffic data is shown in Table All.2. The DM scenario includes the in-combination effects including following developments;

- Stubbington Bypass
- Land at Old Street, Stubbington (P/17/1451/OA)
- Newlands Farm, Fareham (P15/1279/OA)
- Daedalus Development

Table AII.2 2024 Traffic Data

Road Link		Road Width (m)	Mean Vehicle Speed (km/h)	DM		DS	
				24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
1	A27 Roundabout	10.0	24	57,996	2.37	58,066	2.37
2	A27 - S of M27 S bound	11.0	89	29,048	2.37	29,118	2.37
3	A27 - S of slip to Delme S bound	7.0	89	29,048	2.37	29,118	2.37
4	A27 - S of Delme S bound	7.0	48	32,830	3.26	32,900	3.26
5	A27 - S of slip to Delme S bound	7.0	48	32,830	3.26	32,900	3.26
6	A27 - S of M27 N bound	10.5	32	29,048	2.37	29,118	2.37
7	A27 - N of slip from Delme N bound	10.5	89	29,048	2.37	29,118	2.37
8	A27 - S of slip from Delme N bound	6.5	89	32,830	3.26	32,900	3.26
9	A27 - N of slip to Delme N bound	6.5	48	32,830	3.26	32,900	3.26
10	A27 - S of slip to Delme N bound	6.5	48	32,830	3.26	32,900	3.26
11	Delme Roundabout	8.5	24	34,007	1.73	34,077	1.73
12	A27 Slip from A27 W bound	6.5	72	5,890	2.37	5,960	2.37
13	A27 Slip to Delme Roundabout W bound	6.5	24	5,890	2.37	5,960	2.37
14	A27 Slip from Delme Roundabout E bound	6.0	72	5,890	2.37	5,960	2.37

Road Link		Road Width (m)	Mean Vehicle Speed (km/h)	DM		DS	
				24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
15	A27 Slip to Delme Roundabout E bound	6.0	24	6,647	3.26	6,717	3.26
16	A27 Slip from A27 E bound	6.0	72	6,647	3.26	6,717	3.26
17	A27 Slip from Delme Roundabout W bound	6.0	72	6,647	3.26	6,717	3.26
18	Wallington Way S bound	7.0	16	10,516	3.75	10,586	3.75
19	Wallington Way S bound	7.0	48	10,516	3.75	10,586	3.75
20	Wallington Way N bound	7.5	48	10,516	3.75	10,586	3.75
21	Cams Hill - E of Delme E bound	7.5	24	17,054	1.73	17,124	1.73
22	Cams Hill - W of Cams Hall E bound	10.0	16	17,054	1.73	17,124	1.73
23	Cams Hill - E of Cams Hall E bound	7.0	48	17,054	1.73	17,124	1.73
24	Cams Hill - W of Downend Road E bound	7.0	16	15,607	1.92	15,677	1.92
25	Portchester Road - E of Downend Road E bound	7.0	48	12,317	2.46	12,387	2.46
26	Cams Hill - E of Delme W bound	6.5	16	17,054	1.73	17,124	1.73
27	Cams Hill - W of Cams Hall W bound	6.5	24	17,054	1.73	17,124	1.73
28	Cams Hill - E of Cams Hall W bound	7.0	16	15,607	1.92	15,677	1.92
29	Cams Hill - W of Downend Road W bound	7.0	48	15,607	1.92	15,677	1.92
30	Portchester Road - E of Downend Road W bound	8.0	48	12,317	2.46	12,387	2.46
31	Portchester Road - W of Portchester roundabout	13.0	48	24,534	2.46	24,604	2.46
32	Portchester Road - W of Portchester roundabout	13.0	16	24,534	2.46	24,604	2.46
33	Portchester Roundabout	7.5	16	24,534	2.46	24,604	2.46
34	Portchester Road - E of Portchester roundabout	13.0	16	24,707	2.47	24,777	2.47
35	Portchester Road - W of Beauliea Ave	13.0	48	24,707	2.47	24,777	2.47
36	Portchester Road - E of Beauliea Ave	12.0	48	24,707	2.47	24,777	2.47

Road Link		Road Width (m)	Mean Vehicle Speed (km/h)	DM		DS	
				24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
37	Portchester Road - W of Cornaway Lane roundabout E bound	6.0	48	12,457	2.52	12,527	2.52
38	Portchester Road - W of Cornaway Lane roundabout E bound	6.5	16	12,457	2.52	12,527	2.52
39	Portchester Road - W of Cornaway Lane roundabout W bound	6.5	48	12,457	2.52	12,527	2.52
40	Cornaway Lane Roundabout	6.0	16	24,814	2.52	24,884	2.52
41	West street - E of Cornaway Lane Roundabout	11.0	16	17,905	1.99	17,975	1.99
42	west street - W of Downsway	11.0	32	17,905	1.99	17,975	1.99
43	West street - W of West Street Roundabout E bound	6.0	16	9,003	1.99	9,073	1.99
44	West street - W of West Street Roundabout W bound	6.0	16	9,003	1.99	9,073	1.99
45	West Street Roundabout	7.5	16	19,387	1.89	19,457	1.89
46	West street - E of West street roundabout E bound	6.5	32	9,744	1.89	9,814	1.89
47	West street - W of Castle Street roundabout E bound	6.5	16	9,744	1.89	9,814	1.89
48	West street - E of West street roundabout W bound	6.5	16	9,744	1.89	9,814	1.89
49	West street - W of Castle Street roundabout W bound	6.5	32	9,744	1.89	9,814	1.89
50	Castle Street Roundabout	7.5	16	24,883	1.99	24,953	1.99
51	East street - E of Castle street Roundabout E bound	6.5	32	12,492	1.99	12,562	1.99
52	East Street - W of Murrills Estate E bound	6.5	16	12,492	1.99	12,562	1.99
53	East Street - E of Murrills Estate E bound	8.0	16	12,492	1.99	12,562	1.99
54	East street - E of Castle street Roundabout W bound	6.5	16	12,492	1.99	12,562	1.99

Road Link		Road Width (m)	Mean Vehicle Speed (km/h)	DM		DS	
				24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
55	East street - E of Castle street Roundabout W bound	6.5	32	12,492	1.99	12,562	1.99
56	East Street - E of Murrills Estate W bound	6.0	16	12,492	1.99	12,562	1.99
57	on site	4.0	16	0	0.00	0	0.00
58	trainline	5.0	72	0	0.00	0	0.00
59	trainline	5.0	72	0	0.00	0	0.00
60	Eastern/Western Way bridge	4.2	48	16,380	2.32	16,521	2.32
61	Eastern Way onto A32 South	10.4	16	32,559	2.32	32,699	2.32
62	Eastern Way exiting Roundabout	6.8	16	32,559	2.32	32,699	2.32
63	Western Way Westbound	6.7	48	6,754	2.52	6,894	2.52
64	Western Way Slowdown onto Roundabout	10.1	16	6,754	2.52	6,894	2.52
65	A32 approaching juction to left	4.1	16	14,232	2.60	14,372	2.60
66	A27 exiting roundabout onto Western Way	4.6	16	4,570	2.52	4,710	2.52
67	A32 Roundabout Approach	7.2	16	14,232	2.60	14,372	2.60
68	Eastern Way onto A32 Southbound	3.6	16	14,232	2.60	14,372	2.60
69	Roundabout exit onto A27	7.5	16	16,380	2.32	16,521	2.32
70	Gosport Road Junction	9.6	16	67,924	1.62	68,064	1.62
71	Western Way, Westbound	7.0	48	6,754	2.52	6,894	2.52
72	A32 Southbound	6.9	32	28,263	2.60	28,403	2.60
73	Old Gosport Road Slowdown	5.2	16	28,263	2.60	28,403	2.60
74	Gosport Road Exit	7.2	16	28,263	2.60	28,403	2.60
75	Gosport Road Exit North of Old Gosport Road	7.8	16	28,263	2.60	28,403	2.60
76	Gosport Road North of Old Gosport Road	6.8	32	28,263	2.60	28,403	2.60
77	Old Gosport Road Roundabout Approach Northbound	6.8	16	28,673	2.60	28,813	2.60

Road Link		Road Width (m)	Mean Vehicle Speed (km/h)	DM		DS	
				24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
78	Old Gosport Road Roundabout	10.0	16	43,272	3.46	43,552	3.46
79	Gosport Road South, Southbound	6.5	32	28,673	2.60	28,813	2.60
80	Slowdown onto Newgate Lane Junction	7.3	16	28,673	2.60	28,813	2.60
81	A32	8.6	16	29,735	3.21	29,875	3.21
82	Gosport Road South, Northbound	7.3	32	28,499	2.60	28,639	2.60
83	Newgate Lane, Merge, North	3.8	16	15,798	2.60	16,222	2.60
84	Access Road	7.0	16	14,555	2.60	14,695	2.60
85	Newgate Lane	6.5	32	32,369	3.00	32,793	3.00
86	A32 onto Gosport Road Loop	6.4	16	15,083	3.21	15,223	3.21
87	Gosport Road Traffic Lights	11.4	16	29,555	3.21	29,695	3.21
88	A32/Gosport Road	7.2	32	29,083	3.21	29,223	3.21
89	Gosport A27 roundabout	8.0	24	8,330	3.00	8,470	3.00
90	Gosport A27 Eastbound Speed Up	6.5	24	8,330	3.00	8,470	3.00
91	Gosport A27 Westbound Slow Down	10.6	16	8,330	3.00	8,470	3.00
92	Gosport A27 Westbound Speed Up	10.6	24	8,330	3.00	8,470	3.00
93	Gosport A27 Eastbound Slow Down	6.9	16	8,330	3.00	8,470	3.00
94	Gosport A27 Eastbound	6.9	48	8,330	3.00	8,470	3.00
95	Gosport A27 Westbound	7.5	48	8,330	3.00	8,470	3.00
96	The Avenue A27	13.3	48	16,520	3.00	16,660	3.00

Emission Factors

Given the 2024 opening year and 2017 baseline emissions it would be unreasonable not to assume any reduction to emission factors as a direct result of increasing EV fleets and future advancements to low emission technologies. To present a worse-case sensitivity analysis of future year emission factor CURED was utilised to calculate NOx emissions. Whilst the toolkit considers future year emission reductions it does not support the extent predicted by DEFRAs EFT. CURED crucially provides a more realistic and worse case assumption.

Meteorological Data

Meteorological data used in this assessment was taken from Thorney Island meteorological station over the period 1st January 2017 to 31st December 2017 (inclusive). Thorney Island meteorological station is located at approximate NGR: 476389, 102497, which is approximately 16km south east of the proposed development.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK.

Roughness Length

A roughness length (z_0) of 0.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.3m was utilised to represent the morphology of the meteorological station location and is suggested as being suitable for 'agricultural areas (max)'

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and meteorological station location and is suggested within ADMS-Roads as being suitable for 'small towns < 50,000'.

Background Concentrations

An annual mean NO_2 concentration of 15.38µg/m^3 as predicted by DEFRA, was used in the dispersion modelling assessment to represent annual mean pollutant levels at the proposed development site.

Table AII.3 displays the specific background concentrations used in the verification process. This data was used in to ensure an accurate and robust model.

Table AII.3 Predicted Diffusion Tube Monitoring Background Pollutant Concentrations

FBC Monitoring Location	Pollutant	2017 Predicted Background Concentration (µg/m^3)
BL1, CM1/2/3	NO_x	33.17
	NO_2	21.98
	PM_{10}	15.49
	$PM_{2.5}$	10.84
G1A, G2A, G3, G4, G6, G7, G8Z, G10, G11, G12, G14, GR/RL, E/1/2/3, FAR1	NOx	26.01
	NO_2	17.82
	PM_{10}	15.15
	$PM_{2.5}$	10.75
PS1/PS1A/PS1B, PS2, PS3, PS4/5/6, FAR2, WW1/2/3	NO_x	28.24
	NO_2	19.13
	PM_{10}	15.27
	$PM_{2.5}$	10.91

An annual mean NOx concentration of 28.22µg/m_3 was utilises for Portsmouth Harbour ecological receptors as predicted by APIS, was used in the dispersion modelling assessment to represent annual mean pollutant levels across the designated ecological sites.

Similar to emission factors, background concentrations for 2017 were utilised in preference to the development opening year of 2024. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operation of the proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM (TG16)[3].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2017, using traffic data, meteorological data and monitoring results from this year.

FBC undertakes monitoring of NO_2 concentrations at several suitable monitoring location for verification purposes within the assessment extents. The road contribution to total NOx concentration was calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within DEFRA guidance LAQM (TG16)[2].

The dispersion model was run with the traffic input data previously detailed for 2017 to predict the NOx concentration at the monitoring locations.

The road contribution to total NO_x concentration was calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within IAQM and EPUK guidance LAQM (TG16)[3] .

The dispersion model was run with the traffic input data previously detailed for 2017 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.5.

Table AII.5 NO_x Verification Results

WMBC ID	Modelled Road NO_x Concentration (µg/m^3)	Monitored Road NO_x Concentration (µg/m^3)	Difference (%)
G1A	44.40	23.48	-89.10
G2A	41.40	19.86	-108.46
G3	22.30	13.72	-62.54
G6	23.60	17.55	-34.47
G7	22.60	34.73	34.93
G8Z	27.50	18.81	-46.20
G10	20.40	32.25	36.74
G11	27.50	11.18	-145.97
G12	21.30	33.60	36.61
G14	24.90	16.93	-47.08
PS1/A/B	32.60	22.31	-46.12
PS2	24.60	29.30	16.04
PS3	19.20	30.64	37.34
PS4/5/6	48.50	31.76	-52.71

WMBC ID	Modelled Road NO_x Concentration ($\mu g/m^3$)	Monitored Road NO_x Concentration ($\mu g/m^3$)	Difference (%)
BL1	17.80	19.29	7.72
WW1	25.10	9.40	-167.02
WW2	14.80	22.74	34.92
CM3	26.90	10.88	-147.24
E1/2/3	66.40	30.02	-121.19
V	13.50	17.65	23.51
J	25.10	34.21	26.63

The monitored and modelled NO_x road contribution concentrations were calculated and the equation of the trendline based on the linear progression through zero was calculated, this is shown in **Graph 1.** This indicated that a verification factor of **0.7020** was required to be applied to all NO_x modelling results, showing the model has a slight tendency to overestimate pollutant concentrations throughout the assessment extents. For the purpose of this report a verification factor of **1.000.**

Graph 1 Verification Adjustment Factor

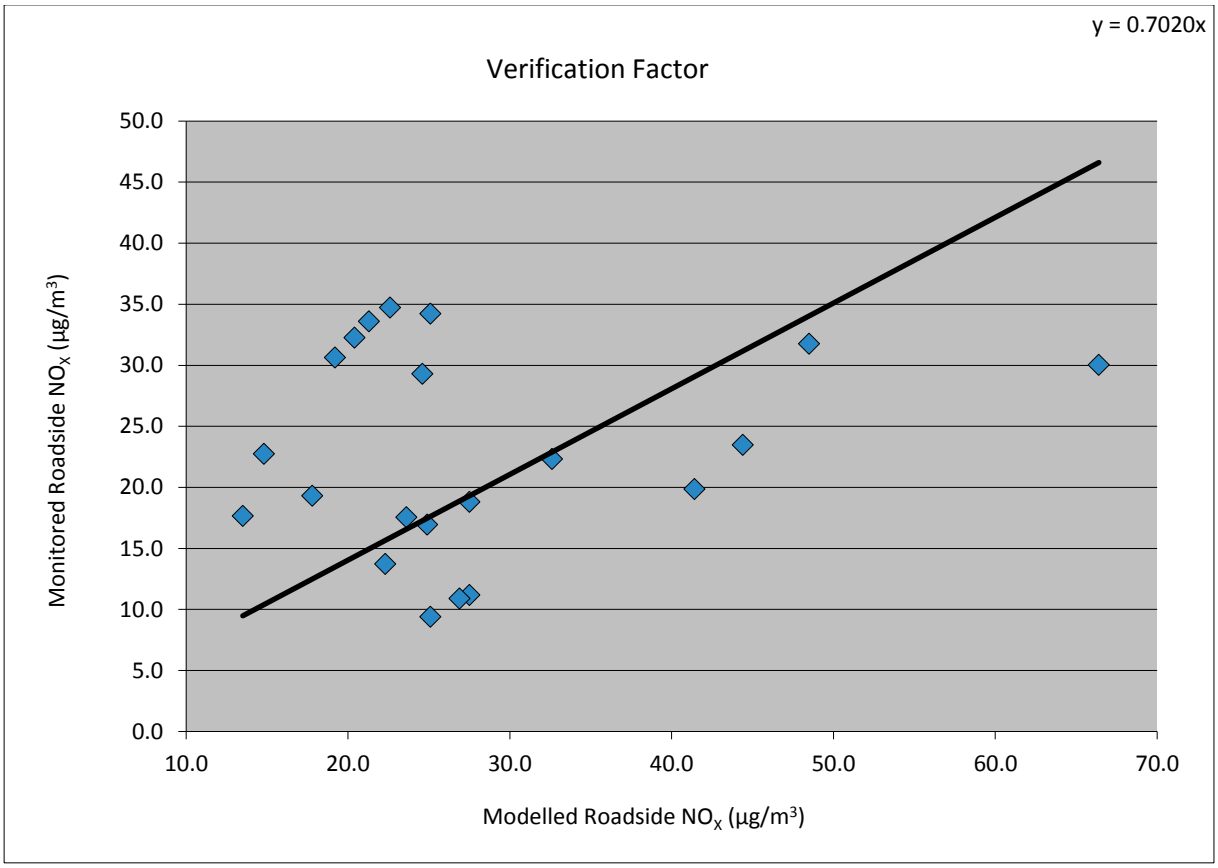

Table AII.6 presents the monitored annual mean NO_2 concentrations and the adjusted modelled total

NO_2 concentration based on the above verification factor. Exceedances of the relevant AQO are highlighted in **bold.**

Table AII.6 NO_2 Verification Results

WMBC ID	Monitored NO_2 Concentration ($\mu g/m^3$)	Adjusted Modelled Total NO_2 Concentration ($\mu g/m^3$)	Difference (%)
G1A	29.40	32.91	-11.94
G2A	27.70	31.96	-15.38
G3	24.40	25.34	-3.87
G6	26.60	26.13	1.77
G7	34.50	25.79	25.25
G8Z	27.20	27.43	-0.85
G10	33.40	25.04	25.03
G11	23.50	27.43	-16.72
G12	34.00	25.34	25.47
G14	26.30	26.56	-0.99
PS1/A/B	30.10	30.36	-0.87
PS2	33.30	27.72	16.75
PS3	33.90	25.90	23.59
PS4/5/6	34.40	35.41	-2.94
BL1	31.40	28.18	10.27
WW1	23.90	27.89	-16.71
WW2	30.30	24.38	19.53
CM3	27.40	31.21	-13.89
E1/2/3	32.40	39.61	-22.25
V	24.90	20.87	16.18
J	32.60	24.88	23.68

APPENDIX II ASSESSOR'S CURRICULUM VITAE

CONAL KEARNEY

Head of Noise and Air

BEng(Hons), MSc, MIAQM, MIEnvSc

KEY EXPERIENCE:

Conal is Head of Noise and Air with specialist experience in the air quality and odour sector. His key capabilities include:

- Advanced atmospheric air dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS and AIRVIRO.
- Preparation of factual and interpretative Air Quality Assessment reports and Air Quality Environmental Statement chapters in the vicinity of proposed schemes and developments in accordance with DEFRA, Environment Agency and Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) methodologies.
- Management and delivery of project work on key, land development and urban regeneration projects.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Dust and Odour impact assessments from minerals and waste sites
- Representing clients at public inquiries and planning hearings as an expert witness.

QUALIFICATIONS:

- Bachelor of Engineering
- Master of Science
- Member of Institute of Air Quality Management
- Member of the Institute of Environmental Science (IES)

SELECT PROJECTS SUMMARY:

Industrial Developments

Land at Mossdown Road, Oldham – energy from waste incinerator. Industrial and road impacts on air quality dust and odour.

Buck Park, Denholme - AQA and dust assessment for proposed mineral extraction and site restoration project.

Messingham Quarry, North Lincolnshire - AQA and dust impacts for proposed new sand extraction site.

Arden Quarry, Derbyshire - AQA for proposed mineral extraction and site restoration

Granta Park, Oxfordshire. Assessment of VOC fume emissions.

University of Birmingham. Permit application for CHP scheme.

Arbroath Road, Carnoustie. Odour and AQA for biogas CHP scheme.

Brenda Road, Hartlepool – Dispersion modelling to inform stack design for biogas AD facility environmental permit.

Highways Developments

Alderley Edge Bypass, Cheshire - AQA for major new road scheme.

South Heywood – EIA for new link road and mixed use joint development

Residential and Mixed-Use Developments

Orchard Close, Knaresborough. AQA and public inquiry evidence.

Friars School, Southwark, London. School development for mixed use education and residential building in AQMA.

Fairoaks Garden Village – ES chapter and input fir major mixed use development

Westcraig, Edinburgh - EIA chapter and input for major residential development

Queensway, Lytham St Annes. Dust and odour assessment for development. Public Inquiry expert witness

Manor Place, London. Road and energy generation dispersion emissions assessment

Craven Park, London. Mitigation statement and planning hearing expert opinion

Public Sector

Technical advisor on Manchester Airport Consultative Committee - advise members on environmental technical matters in relation to the airport's operations.

Cheshire County Council - compile AQ chapters for Local Transport Plan

Cheshire East Council - specialist AQ advice on highways, minerals and waste projects

Local Air Quality Management

Broughton Gyratory, Chester - dispersion model for City Centre detailed assessment report

Congleton town centre - dispersion modelling assessment for detailed and further assessment reports.

Disley - dispersion modelling assessment for detailed and further assessments

Holmes Chapel - dispersion modelling assessment for detailed and further assessment reports for road and rail sources.

Crewe - town centre dispersion modelling for detailed and further assessment reports.

Commercial Developments

Granta Park Daycare Centre, Oxfordshire. AQA for new build daycare centre adjacent to major road.

Curzon Cinema, Colchester. Air quality assessment for town centre new build cinema.

Newfoundland Circus, Bristol - AQA for hotel development in city centre

Salesians School, Chertsey - AQA for school extension near M25.

Cathedral Street and Thistle Street, Glasgow. University energy generation emission assessments.

RACHAEL HARRISON

Graduate Air Quality Consultant

BSc (Hons).

KEY EXPERIENCE:

Rachael is a Graduate Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Production of air quality mitigation strategies for developments throughout the UK.
- Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- Bachelor of Science

SELECT PROJECTS SUMMARY:

Environmental Impact Assessment:

Warburton Lane, Trafford – EIA for a large scale residential development of 473 dwellings

Residential Development:

Smithy Bridge Air Quality Assessment in support of a proposed development comprising of 200 residential dwellings in close proximity to the A58.Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be above the air quality standards at sensitive locations across the site and as such mitigation measures were required and referenced. Subject to the inclusion of the relevant mitigation measures, air quality issues were not considered a constraint to planning consent

Minster Way, East Yorkshire AQA for a Large scale residential development comprising a two phase development of circa 400 residential units.

Hucknall, Nottinghamshire AQA In support of a residential development of the site to provide 60 residential dwelling.

Vaughan Way, Leicester AQA in support of an extension to an existing building to provide 39 residential units across four additional floors.

Thame Park Road, Thame AQA in support of 175 residential dwellings with an additional 25 residential dwellings for a second phase.

Mixed Use Development:

Rotherhithe Street, Southwark - Air Quality Assessment in support of a proposed mixed use scheme mixed use development comprising of circa 7 residential units and one commercial unit. Concerns were raised as the site was located within the London Borough of Southwark AQMA. Subsequently, there were concerns the proposals would introduce future users to poor air quality. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be below the relevant AQO across the site, air quality was not considered to be a planning constraint

Commercial Development

132 Broughton Street, Manchester - AQA in support of a proposed Cash and carry Warehouse located in in the vicinity of Great Manchester AQMA.

Weston Hall Farm, Crewe AQA in support of the proposal comprising the change of use of current agricultural buildings to form a new commercial warehouses.

Holloway Road, Islington AQA in support of a two storey extension above the existing site to provide approximately 430m2 of additional floor space for office use Concerns were raised as the site was located within the London Borough of Islington AQMA

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