Air Quality Assessment

Manor Farm Phase II, Elkesley

Client: William Saunders

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Executive Summary

Redmore Environmental Ltd was commissioned by William Saunders to undertake an Air Quality Assessment in support of a planning application for the Manor Farm Phase II residential development on land off Twyford Lane, Elkesley.

The proposals comprise the conversion and extension of existing buildings and erection of a two-storey structure to provide four residential units and associated infrastructure. The scheme will occupy land immediately to the north of the previously consented residential development known as Manor Farm Phase I.

The Phase II scheme may lead to the exposure of future occupants to elevated pollution levels, as well as adverse air quality effects at sensitive locations. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts as a result of the scheme.

Dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed development site as a result of emissions from the local highway network. Outputs were subsequently verified using local monitoring data.

The results of the dispersion modelling assessment indicated that predicted pollutant levels were below the relevant criteria across the development. As such, the site is considered suitable for the proposed end-use from an air quality perspective.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the relevant screening criteria. Due to the limited number of anticipated vehicle trips associated with the proposals, road traffic impacts were not predicted to be significant.

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

Table of Contents

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by William Saunders to undertake an Air Quality Assessment in support of a planning application for the Manor Farm Phase II residential development on land off Twyford Lane, Elkesley.

1.1.2 The development may lead to the exposure of future occupants to poor air quality, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was required in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The development is located at Manor Farm, Twyford Lane, Elkesley, to the north of the previously consented residential development known as Manor Farm Phase I, at approximate National Grid Reference (NGR): 469110, 375495. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the conversion and extension of existing buildings and erection of a two-storey structure to provide four residential units and associated infrastructure.

1.2.3 The development is located within close proximity to the A1 and associated vehicle exhaust emissions. This may result in poor air quality at the site and subsequent exposure of future users to elevated pollutant concentrations. Additionally, the proposals may cause air quality impacts at sensitive locations during the operational phase. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 European Directives

2.1.1 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 Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm. The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient 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.

2.1.2 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 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose 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 5 pollutants.

2.2.2 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[1]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.2.4 Table 2 summarises the advice provided in DEFRA guidance[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective 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

[1] The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

[2] Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
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 and 8-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

2.3 Local Air Quality Management

2.3.1 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 jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework[3] (NPPF) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

[3] NPPF, Ministry of Housing, Communities and Local Government, 2019.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

> "c) An environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> e) preventing new and existing development from contributing to, 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 […]"

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

> "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."

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

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[4] (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 air quality pages are summarised under the following headings:

1. Why should planning be concerned about air quality?
2. What is the role of Local Plans with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to a planning decision?
6. Where to start if bringing forward a proposal where air quality could be a concern?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?
9. How do considerations about air quality fit into the development management process?

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

2.6 Local Planning Policy

2.6.1 Bassetlaw District Council (BDC) adopted the Core Strategy and Development Management Policies Development Plan Document[5] (DPD) in December 2011. This sets out a vision for change in Bassetlaw up to 2028. A review of the document indicated the following policy of relevance to this report:

[4] http://planningguidance.planningportal.gov.uk.

[5] Core Strategy and Development Management Policies DPD, BDC, 2011.

"Policy DM4: Design and Character

A. Major Development Principles

All major development proposals will need to demonstrate that they:

i) Make clear functional and physical links with the existing settlement and surrounding area and have not been designed as 'standalone' additions. Where physical links cannot be made (e.g. for reasons of third party land ownership) provision must be made such that they can be provided in future should the opportunity arise;
ii) Complement and enhance the character of the built, historic and natural environment;
iii) Are of a scale appropriate to the existing settlement and surrounding area and in line with the levels of proposed growth for that settlement as set out in policies CS1-CS9; and,
iv) Provide a qualitative improvement to the existing range of houses, services, facilities, open space and economic development opportunities.

Where neighbouring or functionally linked sites will come forward together within the timeframe of this DPD, the Council will expect applicants to work together with the Council to ensure that any proposals are, or can be, properly integrated and will provide complementary development.

Proposals for major residential or mixed-use development will be expected to demonstrate that they score well (allowing for site constraints where applicable) against the design principles established in the Building for Life guidance and any subsequent or complementary best practice guidance on design and placemaking by the Commission for Architecture and the Built Environment (CABE) or comparable organisation.

B. General Design Principles

Individual development proposals, including single buildings, changes of use or extensions to existing buildings, will only be accepted where they are of a high-quality design that addresses the relevant areas below:

i) Local character and distinctiveness

New development, particularly backland and infill development, should respect its wider surroundings, in relation to historic development patterns or building/plot sizes and forms; density; and landscape character.

ii) Architectural quality

New development should respect its context, without resorting to negative pastiche architecture, in terms of density, height, scale, mass, materials and detailing. Developments in prominent positions at 'gateways' to settlements or town centres will be of particularly high-quality design that will serve to reinforce a positive perception about the quality of place.

iii) Public realm

New development should support stimulating and safe streets and public spaces, with active frontages at ground level to public spaces; have appropriate landscaping and boundary treatments (retaining historic walls and hedgerows); integrate crime prevention measures where this will not compromise the other principles of good design; and provide useable and functional open space.

iv) Accessibility

New development should ensure that all people, including those with disabilities, can easily and comfortably move through and into it; prioritise safe, easy and direct pedestrian movement and the creation of a network of attractive, well-connected public spaces; establish both visual and functional relationships between the different parts of a development and between the development and its wider setting.

v) Amenity

New development should ensure that it does not have a detrimental effect on the residential amenity of nearby residents; provides a decent standard of private amenity space; allows adequate space for waste and recycling storage and collection; and is not to the detriment of highway safety.

vi) Carbon reduction

New development will need to demonstrate that careful consideration has been given to minimising CO_2 emissions and measures that will allow all new buildings in Bassetlaw to adapt to climate change. Such measures include, but are not limited to: use of suitable construction materials; site layout and building orientation that makes best use of passive heating and cooling, natural light and natural ventilation; minimising water consumption and maximising water recycling; achieving the highest feasible level of energy efficiency; and maximising opportunities to integrate renewable and low carbon energy infrastructure.

Account will also be taken of any relevant Village Design Statement, Conservation Area Appraisal or character appraisal approved or adopted by the District Council and Bassetlaw's Landscape Character Assessment. Where there is obvious tension between the requirements listed above, due to the sensitivity of the location of certain sites, the Council will work with applicants and local residents to achieve a balanced solution. Some factors are likely to outweigh others in reaching a decision in such cases."

2.6.2 The implications of the above policy were taken into consideration throughout the undertaking of the assessment.

3.0 BASELINE

3.1 Introduction

3.1.1 Existing air quality conditions in the vicinity of the development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

3.2.1 As required by the Environment Act (1995), BDC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the AQS are currently below the relevant AQOs. As such, no AQMAs have been designated within the district.

3.3 Air Quality Monitoring

3.3.1 Monitoring of pollutant concentrations is undertaken by BDC throughout their area of jurisdiction. Recent results recorded in the vicinity of the development are shown in Table 3.

Table 3 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration ($\mu g/m^3$)		
		2016	2017	2018
28	Elkesley, A1	-(a)	20.1	19.80
29	Lincoln Road, A1 Overpass, Tuxford	39.4	37.5	35.55
32	Birch Court, Tuxford	26.7	22.1	24.46

Note: (a) Monitoring data not available.

3.3.1 As shown in Table 3, annual mean NO_2 concentrations were below the relevant AQO at all monitors during recent years. Reference should be made to Figure 2 for a map of the survey positions.

3.3.2 BDC do not undertake PM_{10} monitoring within the vicinity of the development.

3.4 Background Pollutant Concentrations

3.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development is located in grid square NGR: 469500, 375500. Data for this location was downloaded from the DEFRA website[6] for the purpose of the assessment and is summarised in Table 4.

Table 4 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2018	2019	2021
NO_2	8.79	8.40	7.76
PM_{10}	15.03	14.86	14.60

3.4.2 As shown in Table 4, predicted background NO_2 and PM_{10} concentrations are below the relevant AQOs at the development site.

[6] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017.

4.0 METHODOLOGY

4.1 Introduction

4.1.1 The proposed development has the potential to expose future occupants to poor air quality and increase pollution levels as a result of operational phase vehicle exhaust emissions. These issues have been assessed in accordance with the following methodology.

4.2 Potential Exposure

4.2.1 Dispersion modelling was undertaken in order to predict NO_2 and PM_{10} concentrations across the site using the ADMS-Roads dispersion model (version 4.1.1.0). 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.

4.2.2 Modelling was undertaken for 2018 to allow verification against recent monitoring results and 2021 to represent the development opening year.

4.2.3 The 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 (z_0); and,
- Monin-Obukhov length.

4.2.4 These are detailed in the following Sections.

Assessment Area

4.2.5 The assessment area was defined based on the development location and roads likely to impact pollutant levels across the site. Ambient concentrations were predicted over NGR: 469015, 375430 to 469235, 375650. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

4.2.6 It should be noted that although the grid only covered the proposed site, source geometries were extended in order to ensure the impact of all relevant emissions in the vicinity of the development were considered.

4.2.7 Reference should be made to Figure 3 for a graphical representation of the assessment grid extents.

Traffic Flow Data

4.2.8 Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as Heavy Duty Vehicle (HDV) proportion, was obtained from the Department for Transport (DfT)[7]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 2000 to 2018. It should be noted that the DfT web tool is referenced in DEFRA guidance[8] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

4.2.9 The baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (Version 7.2). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

4.2.10 Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table 5.

7 http://www.dft.gov.uk/traffic-counts/.

8 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table 5 Traffic Data

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Mean Vehicle Speed (km/h)
		2018	2021			
L1	A1 Worksop Road North of High Street	48,631	50,007	18.45	15.4	80
L2	A1 Twyford Road to A638 Junction 50	48,631	50,007	18.45	15.4	80
L3	A1 Twyford Road to A638 Junction 70	48,631	50,007	18.45	15.4	100
L4	A1 Twyford Road A638 Junction	49,685	51,091	17.61	15.4	100
L5	A1 South of A638 Junction	50,738	52,174	16.80	15.4	100
L6	Newark Road Slipway	1,586	1,631	11.85	8.3	60
L7	Newark Road	1,586	1,631	11.85	8.9	45
L8	Lincoln Road	8,423	8,661	5.30	7.0	45
L9	Ollerton Road	2,702	2,778	9.40	6.2	45
L10	Eldon Street	8,423	8,661	5.30	7.2	45
L11	Ashave Road A1 Junction	2,029	2,086	8.77	8.2	80
L12	Ashave Road A1 Slip On	2,029	2,086	8.77	6.4	90
L13	Ashave Road A1 Slip Off	2,029	2,086	8.77	6.4	90

4.2.11 Reference should be made to Figure 3 for a graphical representation of the road link locations.

Emission Factors

4.2.12 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 9.0). This has been produced by DEFRA and incorporates COPERT 5 vehicle emission factors and fleet information.

4.2.13 There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2018 emission factors were utilised in preference to the development future year in order to provide robust concentration

predictions. As predictions for 2018 were verified, it is considered the results are an indication of worst case concentrations during the operation of the proposals.

Meteorological Data

4.2.14 Meteorological data used in the assessment was taken from Robin Hood Airport meteorological station over the period 1st January 2018 to 31st December 2018 (inclusive). Robin Hood Airport is located at NGR: 465930, 398920, which is approximately 23.2km north of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

4.2.15 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. Reference should be made to Figure 4 for a wind rose of the utilised meteorological data.

Roughness Length

4.2.16 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

4.2.17 A z_0 of 0.2m was used to describe the meteorological site. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

4.2.18 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'small towns.'

Background Concentrations

4.2.19 Background pollutant concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 4.

4.2.20 Similarly to emission factors, background concentrations from 2018 were utilised in preference to the development future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

4.2.21 Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 7.1) provided by DEFRA, which is the method detailed within DEFRA guidance[9].

Verification

4.2.22 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.

4.2.23 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.

4.2.24 For the purpose of the assessment model verification was undertaken for 2018 using traffic data, meteorological data and monitoring results from this year.

[9] Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

4.2.25 BDC undertook monitoring of NO_2 concentrations at three locations within the vicinity of roads included within the model during 2018. The results were obtained and the road contribution to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[10]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table 6.

Table 6 Verification - Monitoring Results

Monitoring Location		Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
28	Elkesley, A1	19.80	11.22
29	Lincoln Road, A1 Overpass, Tuxford	35.55	44.74
32	Birch Court, Tuxford	24.46	20.61

4.2.26 The annual mean road NO_x concentrations predicted from the dispersion model and the 2018 road NO_x concentrations calculated from the monitoring results are summarised in Table 7.

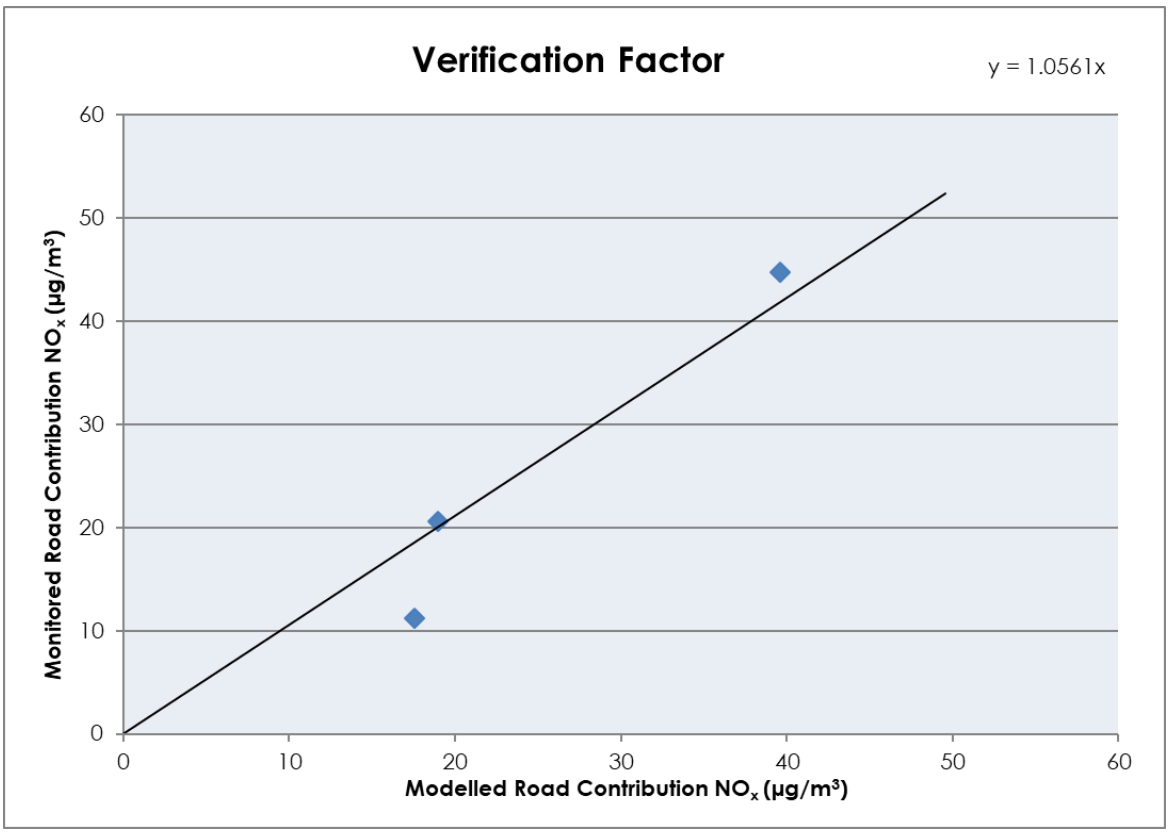
Table 7 Verification - Modelling Results

Monitoring Location		Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
28	Elkesley, A1	11.22	17.53
29	Lincoln Road, A1 Overpass, Tuxford	44.74	39.57
32	Birch Court, Tuxford	20.61	20.61

4.2.27 The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression though zero calculated. This indicated that a verification factor of 1.0561 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

[10] Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Graph 1 Verification



4.2.28 Monitoring of PM_{10} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM_{10} model predictions in lieu of more accurate data in accordance with DEFRA guidance[11].

4.3 Potential Development Impacts

4.3.1 The proposal has 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 during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Institute of Air Quality Management (IAQM) 'Land-Use Planning & Development Control: Planning for Air Quality'[12] guidance to determine the potential for trips generated by the scheme to affect local air quality.

[11] Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

[12] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

4.3.1 The following criteria are provided to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

4.3.2 Should these criteria not be met, then the IAQM guidance[13] considers air quality impacts associated with a scheme to be **negligible** and no further assessment is required.

4.3.3 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[14].

[13] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

[14] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the operation of the proposed development. These are assessed in the following Sections.

5.2 Potential Exposure

5.2.1 The proposed development has the potential to cause the exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Section 4.0 to quantify air quality conditions at the site. Reference should be made to Figure 4 and 5 for graphical representations of the results.

5.2.2 As shown in Figure 5, annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 at all locations across the site. The maximum level at the boundary was 19.76µg/m^3. As such, future residents are not predicted to be exposed to NO_2 concentrations above the AQO.

5.2.3 As shown in Figure 6, annual mean PM_{10} concentrations were predicted to be below the AQO of 40µg/m^3 at all locations across the site. The maximum level at the boundary was 17.74g/m^3. As such, future residents are not predicted to be exposed to PM_{10} concentrations above the AQO.

5.2.4 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs at any location within the development. The site is therefore considered suitable for the proposed use from an air quality perspective.

5.3 Potential Development Impacts

5.3.1 Any additional vehicle movements associated with the proposals will generate exhaust emissions on the local and regional road networks. Predicted trip generation was not available to inform the assessment. However, similar schemes have shown an anticipated value of 6 car movements per day per dwelling. This is equal to the generation of 24 daily trips from the proposals.

5.3.2 Based on the above information, it is not anticipated that the proposal will result in an increase in AADT flows of more than 500 AADT on any individual road link, include significant highway realignment or the introduction of a junction and there will not be a requirement for more than 100 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **negligible**, in accordance with the IAQM[15] screening criteria shown in Section 4.3.

15 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by William Saunders to undertake an Air Quality Assessment in support of a planning application for the Manor Farm Phase II residential development on land off Twyford Lane, Elkesley.

6.1.2 The development may lead to the exposure of future occupants to elevated pollution levels, as well as adverse air quality effects at sensitive locations. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts as a result of the scheme.

6.1.3 Dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed development site as a result of emissions from the local highway network. Outputs were subsequently verified using local monitoring data.

6.1.4 The results of the dispersion modelling assessment indicated that predicted annual mean NO_2 and PM_{10} concentrations were below the relevant AQOs across the development. As such, the site is considered suitable for the proposed use from an air quality perspective.

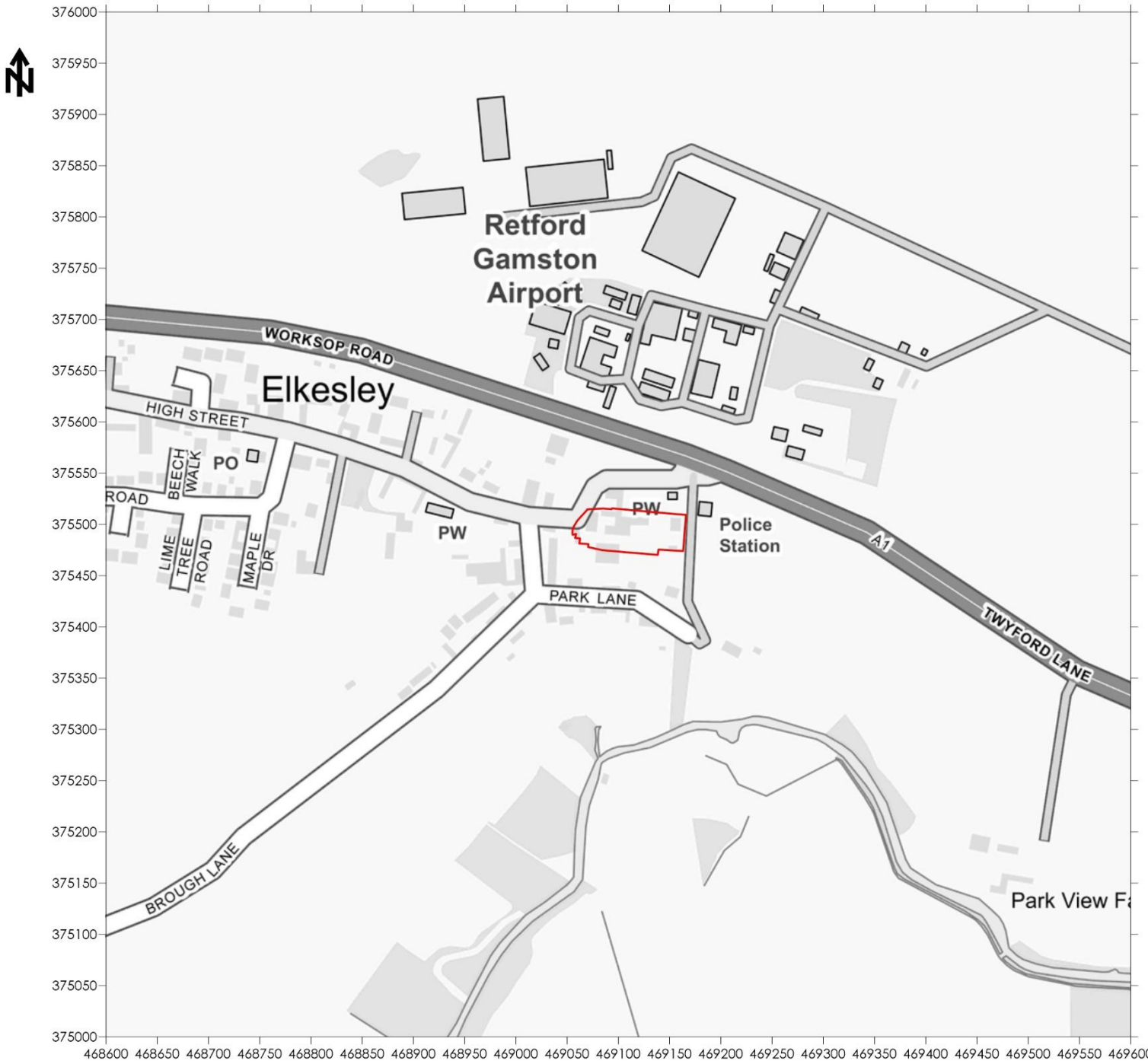
6.1.5 During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within IAQM guidance. Due to the limited number of anticipated vehicle trips associated with the proposals, road traffic exhaust impacts were predicted to be **negligible**.

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

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
BDC	Bassetlaw District Council
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPD	Development Plan Document
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
z_0	Roughness length

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location Plan

Project
Air Quality Assessment
Manor Farm Phase II, Elkesley

Project Reference
1796-1

Client
William Saunders

Redmore environmental
www.red-env.co.uk | 0161 7060075

Legend

Site Boundary

Monitor

Title
Figure 2 - Monitoring Locations

Project
Air Quality Assessment
Manor Farm Phase II, Elkesley

Project Reference
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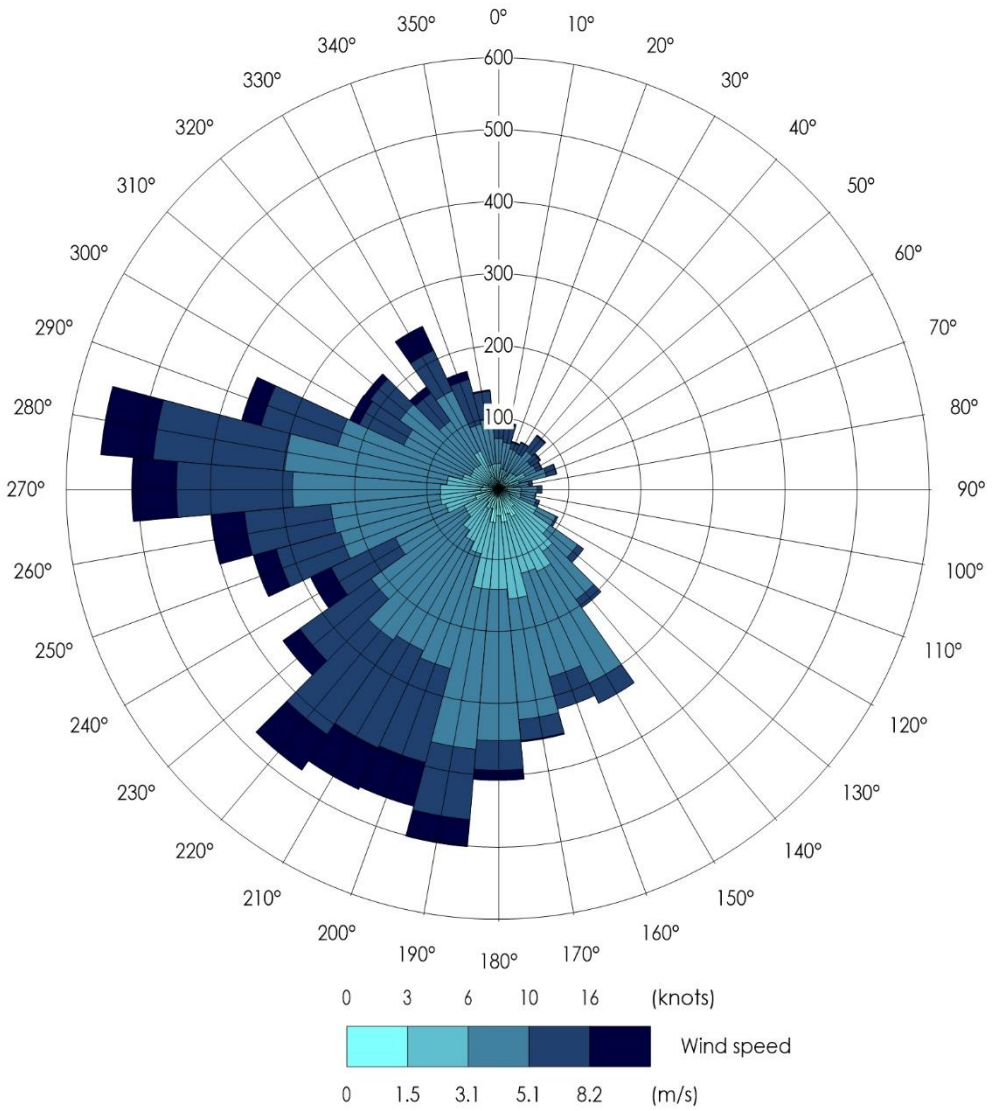

Legend

Title
Figure 3 - Wind Rose of 2018
Robin Hood Airport
Meteorological Data

Project
Air Quality Assessment
Manor Farm Phase II, Elkesley

Project Reference
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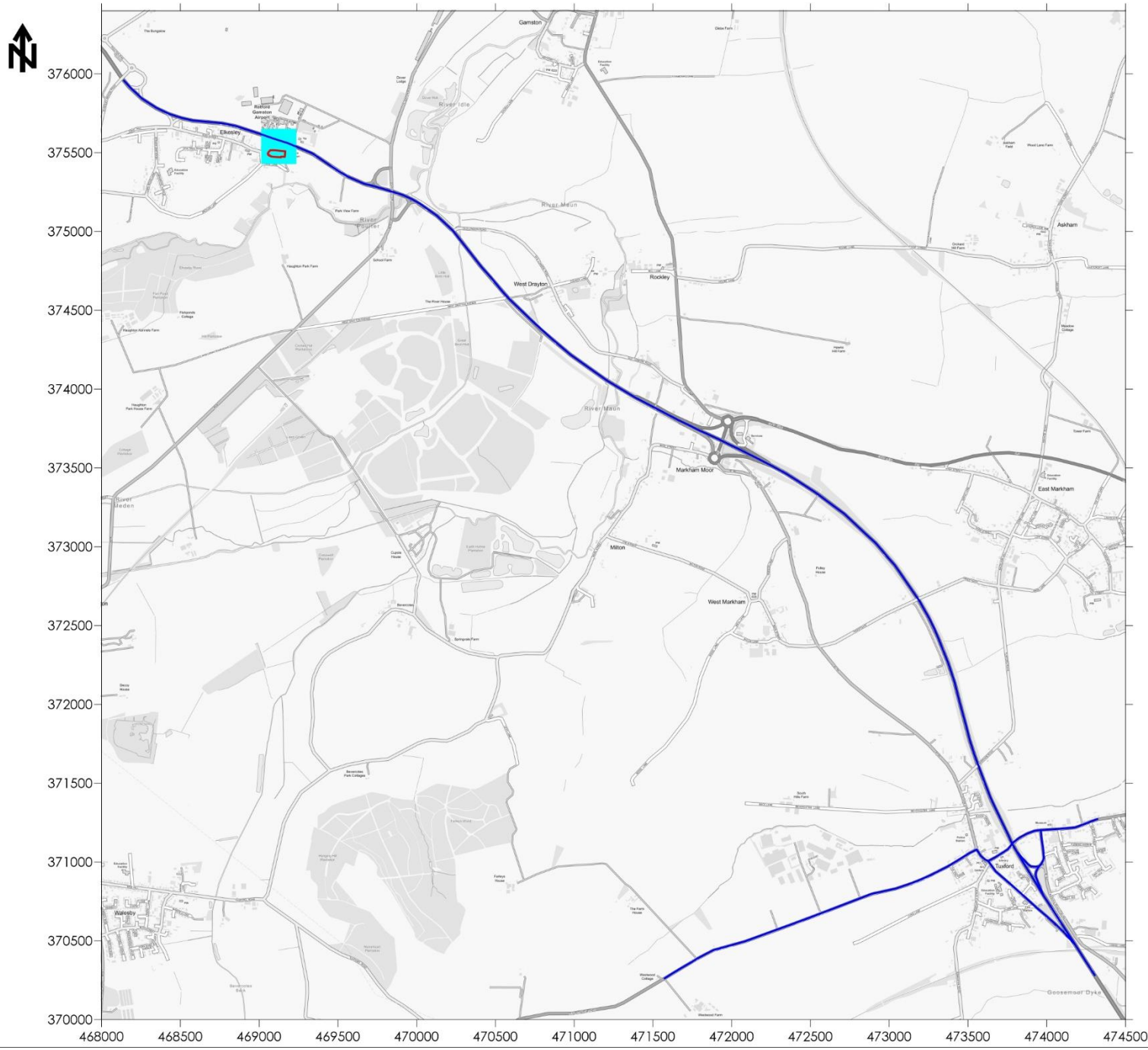

Legend

Site Boundary

Output Grid

Road Link

Title
Figure 4 - ADMS Roads Inputs

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Air Quality Assessment
Manor Farm Phase II, Elkesley

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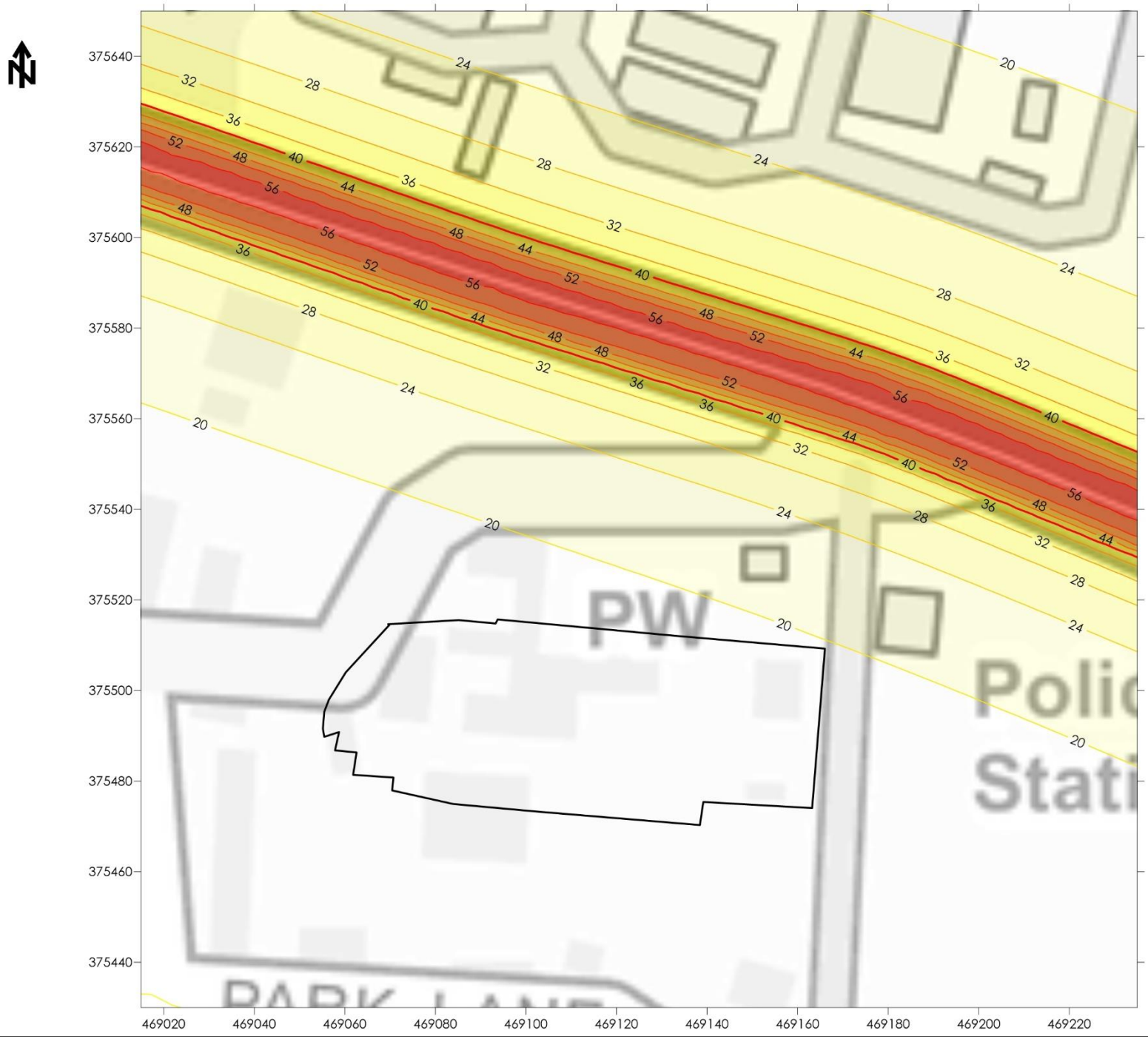

Legend

Site Boundary

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

56
52
48
44
40
36
32
28
24
20
16

Title

Figure 5 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)

Project

Air Quality Assessment
Manor Farm Phase II, Elkesley

Project Reference

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Legend

Site Boundary

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

27.5
26.5
25.5
24.5
23.5
22.5
21.5
20.5
19.5
18.5
17.5

Title

Figure 6 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

Project

Air Quality Assessment
Manor Farm Phase II, Elkesley

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