MEC
Development Technical Consultants

ACOUSTIC AIR

Land West of Fringford Road, Caversfield
Air Quality Assessment
December 2023

Report Ref: 27877-ENV-0402

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REPORT REF: 27877-ENV-0402

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REGISTRATION OF AMENDMENTS

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APPENDICES

1.0 INTRODUCTION

1.1 MEC, has been commissioned by Richborough (hereafter referred to as 'the Client') to undertake an Air Quality Assessment for a proposed residential development on Land west of Fringford Road, Caversfield (hereafter referred to as 'the Site').

Assessment Scope

1.2 This Air Quality Assessment seeks to examine the impact of local road traffic emissions upon existing receptors adjacent to local roads, and future sensitive receptors on the Site. The key traffic related pollutants considered are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The assessment has been undertaken with reference to the advice provided within the Land-Use Planning and Development Control: Planning for Air Quality, and 'Guidance from Environmental Protection UK, May 2017, and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes.

1.4 In addition, a Construction Dust Risk Assessment has been undertaken in accordance with the 'Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance' 2014.

Disclaimer

1.5 MEC has completed this report for the benefit of the individuals referred to in Paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.6 MEC accepts no responsibility or liability for:

a) The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
b) The issue of this document to any third party with whom approval for use has not been agreed.

2.0 SITE DESCRIPTION

Existing Site

2.1 The Site is bound by open green field to the northeast; Fringford Road to the southeast, with existing residential beyond; Aunt Elms Lane to the southwest, with open green field and the B4100 located beyond; and Caversfield House and grounds to the northwest.

2.2 The principal source of noise affecting the Site will be from local road traffic using Fringford Road, Aunt Elms Lane and the distant B4100.

2.3 An approximate redline boundary is presented in Figure 2.1.

Figure 2.1: Approximate Redline Boundary

Development Proposals

2.4 Demolition of existing structures and erection of up to 99 dwellings, access, open space and associated works (outline, all matters reserved save for access).

2.5 The Illustrative Masterplan is presented in **Appendix A**.

3.0 LEGISLATION, POLICY AND GUIDANCE

3.1 This section of the report outlines the policy and legislative context of the proposed development with respect to local air quality.

3.2 Definitions of units and terms used to quantify air pollutant concentrations are provided in **Appendix B**.

Environment Act 2021

3.3 Part IV of the Environment Act 2021 (the Act) requires UK government and devolved administrations to produce a national air quality strategy containing standards, objectives and measures for ameliorating ambient air quality and to continually review these policies.

3.4 The Act also provides a legislative framework for a system of Local Air Quality Management (LAQM). This system is an integral part of delivering the UK's air quality obligations.

3.5 Under the LAQM regime, responsible authorities are required to carry out a regular review and assessment (R&A) of air quality in their area against defined national objectives, which have been prescribed in regulations for the purposes of LAQM. Where it is found these objectives are unlikely to be met, responsible authorities must designate Air Quality Management Areas (AQMA) and implement Air Quality Action Plans (AQAPs) to tackle the problems.

3.6 Provisions in the Act are largely enabling and allow responsible authorities the power to take forward local policies to suit their own needs. Local circumstance will also determine the content of the local air quality policy, designation of AQMAs and the content of AQAPs.

The National Air Quality Strategy

3.7 Due to the transboundary nature of air pollution, it is appropriate to have an overarching strategy with common aims covering all parts of the UK. For this reason, the National Air Quality Strategy (NAQS) is presented as a joint UK Government and devolved administrations document.

3.8 The most recent NAQS was published in 2011 and established a framework for further air quality improvements across the UK. The NAQS sets out standards and objectives which have been established in order to measure the improvement of air quality.

3.9 The NAQS is a statement of policy intentions or policy targets and as such there is no legal requirement to meet these objectives except in so far as these mirror any equivalent legally binding 'limit values' in EU legislation.

3.10 With minimal exception, the objectives have been met across the UK for all pollutants except particulate matter (PM_{10}) and nitrogen dioxide (NO_2). These pollutants are directly related to road traffic pollution and many of the areas that breach the objectives (designated AQMAs) are located close to major road sources.

3.11 There are a wide range of terms and concepts used in international, national and local air quality policy and legislation and the NAQS discusses air quality in terms of Standards and Objectives. These terms are defined below:

- Standards are the concentrations of pollutants in the atmosphere which can be broadly taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups and ecosystems.
- Objectives are policy targets often expressed as a maximum ambient concentration not to be exceeded either without exception or with a permitted number of exceedances within a given timescale.

National Planning Policy Framework

3.12 The latest National Planning Policy Framework (NPPF), issued by the Ministry of Housing, Communities and Local Government in December 2023, sets out the Government's planning policies for England and how these are to be expected to be applied. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is to be a material consideration in planning decisions.

3.13 Paragraph 180 of the NPPF advises that, with respect to noise, planning policies and decisions should contribute to and enhance the natural and local environment by "...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, taking into account relevant information such as river basin management plans".

3.14 Further, paragraph 192 advises 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."

National Planning Policy Guidance

3.15 The National Planning Practice Guidance (NPPG) provides guiding principles on how planning can take account of new development on air quality.

3.16 Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns may arise if the development is likely to generate an air quality impact in the area, or the development is likely to adversely impact upon the implementation of air quality strategies and action plans, and/or lead to a breach of EU legislation.

3.17 When deciding whether air quality is relevant to a planning application, considerations include whether the development would:

- Significantly affect traffic in the immediate vicinity of the proposed development or further afield.
- Introduce new point sources of air pollution.
- Expose people to existing sources of air pollutants, for example building new homes.
- Give rise to potentially unacceptable impact (such as dust) during construction.
- Affect biodiversity.

Legislation

3.18 The NAQS Objectives are transposed into UK legislation by a series of Regulations including, for England, the Air Quality (England) Regulations 2000, the Air Quality (England) Amendment Regulations 2002, and the Air Quality (England) Amendment Regulations 2004.

3.19 In addition, the UK has a legislative requirement to meet air quality limit values for key pollutants defined at a European level by European Council Directives.

- Directive 2008/50/EC on ambient air quality and cleaner air for Europe; and
- Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and PAH.

3.20 These Directives are transposed into UK legislation by the Air Quality Standards Regulations 2010.

3.21 Table 3.1 summarises the national objectives and European 'limit value' obligations for PM_{10}, $PM_{2.5}$ and NO_2, the key transport-related pollutants of concern in the UK.

Table 3.1: Summary of Air Quality Objectives

Pollutant	Concentration	Measured as *
Nitrogen dioxide	200 μg/m^3	1 hour mean not to be exceeded more than 18 times per year
	40 μg/m^3	Annual mean
Particles (PM_{10} gravimetric)		
All authorities	50 μg/m^3	Daily mean not to be exceeded more than 35 times a year
	40 μg/m^3	Annual mean
Particles ($PM_{2.5}$ gravimetric)	20 μg/m^3 (target)	Annual mean
	12 μg/m^3	2028 Interim target[(a)]
	10 μg/m^3	Legally binding target 2040[(a)]
[(a)] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023		

Local Air Quality Management

3.22 LAQM requires local authorities to undertake a regular Review and Assessment of air quality. Previous guidance (pre-2016) dictated three types of assessment a local authority could carry out.

3.23 The first was an Updating and Screening Assessment (USA), undertaken every three years. A USA considered the changes that had occurred in pollutant emissions and sources since the last round of Review and Assessment that may affect air quality. The USA was then followed by either a Detailed Assessment or a Progress Report.

3.24 A Detailed Assessment was required when the USA identifies a risk of exceeding an air quality objective at a location of relevant public exposure, and the objective is to determine whether it is necessary to declare an AQMA. If the USA does not identify any risk, then a Progress Report was prepared annually in the intervening years between USAs, to maintain continuity in the LAQM process.

3.25 The LAQM system changed in 2016, providing a more streamlined approach and a greater emphasis on action planning to bring forward improvements in air quality and to include local measures as part of EU reporting requirements. As part of the changes to LAQM, from 2016 Annual Status Reports (ASR) will replace all other reports, except Action Plans, to reduce the burden of the reporting cycle.

Construction Dust Nuisance

3.26 There is no specific guidance relating to the assessment of construction dust nuisance within Government documents such as the DMRB. Consequently, guidance from relevant national bodies provides the best advice for establishing the potential impacts from dust. Research carried out by the Buildings Research Establishment (BRE) indicates that the likelihood of complaints concerning dust nuisance is related to the distance of receptors from a construction site and the duration of dust raising activities. This relationship is shown in Table 3.2.

Table 3.2: Likelihood of Dust Complaints by Distance

Duration of dust raising activity onsite	Distance from site			
	< 20 m	20 – 50 m	50 – 100 m	100 – 150 m
	Likelihood of complaint			
> 12 months	Very Likely	Very Likely	Likely	Potential Likelihood
6 – 12 months	Very Likely	Likely	Likely	Potential Likelihood
< 6 months	Very Likely	Likely	Potential Likelihood	Not Likely

Note: Beyond 150 m dust nuisance is considered largely unlikely (Upton & Kukadia, 2002, Measurements of PM_{10} from a Construction Site: A Case Study, prepared by BRE Environment for National Society for Clean Air).

3.27 Further empirically derived measures of the maximum distance from a source of airborne dust within which significant adverse effects are likely to be observed, are presented in Table 3.3.

3.28 These values reflect qualitative estimates derived from historical data presented within environmental assessment reports and expert evidence.

Table 3.3: Qualitative Construction Dust Assessment Criteria

Source Descriptors		Zone for Potentially Significant Effects (Distance from Source)	
Source	**Duration**	**Soiling**	**PM_{10}***
Large construction sites	1 year or more	100 m	25-50 m
Moderate sized construction sites	Months	50 m	15-30 m
Minor construction sites	Weeks	25 m	10-20 m

*Based on 35 permitted exceedances of 50 µg/m^3 in a year, as defined in The Air Quality (England) Regulations.
Source: Adapted from Thames Gateway Bridge – Environmental Statement (Laxen, 2004)

Dust Risk Assessment

3.29 The Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction, February 2014, provides a framework for the assessment of risk.

3.30 The guidance divides activities on construction sites into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

3.31 The assessment methodology considers the following three separate dust effects, with account being taken of the distance of the receptors that may experience these effects.

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.32 The assessment procedures and risk categories for each of the four phases of construction where the potential for dust is high, i.e., those listed above, are summarised in **Appendix C**.

3.33 Step 1 establishes that an assessment will normally be required where there are dwellings within 350m of the site boundary.

4.0 LOCAL AUTHORITY AIR QUALITY REVIEW AND ASSESSMENT

Cherwell District Council

4.1 Cherwell District Council's (CDC) most recently published 2023 ASR identifies "…*four areas where air quality does not meet national air quality objectives for NO2."* The AQMAs are as follows:

- AQMA No. 1 – The designated area incorporates Hennef Way between the junctions with Ermont Way and Concorde Avenue, declared in January 2011 for exceedances of NO_2 objective levels. Located approximately 20km to the north west of the Site.
- AQMA No. 2 – The designated area incorporates sections of Oxford Road, Bloxham Road, South Bar, High Street, Horsefair, North Bar, Warwick Road and Southam Road, Banbury, declared in October 2014 for exceedances of NO_2 objective levels. Located approximately 19km to the north west of the Site.
- AQMA No. 3 – The designated area incorporates a section of Bicester Road, Kidlington to the north of its junction with Water Easton Lane, declared in October 2014 for exceedances of NO_2 objective levels. Located approximately 14km to the south west of the Site.
- AQMA No. 4 – The designated area incorporates sections of Kings End, Queens Avenue, Field Street, St Johns Street, Bicester, declared in October 2015 for exceedances of NO_2 objective levels. Located approximately 1.9km to the south of the Site.

4.2 The latest ASR states the follow; "*The latest monitoring data for 2022 confirms there are exceedances of the annual mean Nitrogen Dioxide objective in one of the four AQMAs and this should therefore be retained. The exceedances are associated with traffic emissions.*

The overall trend for the district has been year-on-year reductions on pollutants, however in 2022 the measured levels were broadly comparable to 2020 and 2021, with some minor reductions and some minor increases, none of the increases were disproportional to the measures increase in background levels around the district. As the first year with a full twelve months of data measures outside of lockdown, a minor increase is not entirely unexpected. There of the four AQMAs remain underneath the minimum safe exposure level, if this continues and no developments in the area increase the likelihood of an increase in road traffic emissions, the AQMA in Kidlington may be eligible for revocation in the next 12 to 24 months, and the AQMAs in Banbury and Bicester may be eligible for revocation further into the future. Cherwell District Council will consider the likelihood of future air pollution increases before deciding on this."

4.3 CDC currently operates 37 diffusion tube monitoring locations throughout the District, and the concentrations of the most relevant monitoring locations to the Site and to be used within the following assessment are shown in Table 4.1.

Table 4.1: Annual Mean NO_2 Concentrations

Site-ID	Location	OS Co-ordinates	Annual Mean Concentrations (µg/m^3)				
			2018	2019	2020	2021	2022
DT32	Bicester – Tamarisk Gardens	458333, 224432	15.9	15.0	11.6	11.8	12.1
DT36	Bicester – Field Street	458214, 222836	31.6	32.1	25.0	25.3	26.8

DT37	Bicester – North Street	458274, 222935	37.6	35.6	27.6	27.9	27.9

4.4 Excluding the results for 2020 and 2021, which will have been affected by local and national 'lockdowns' associated with Covid-19, the information in Table 4.1 indicates that for the most representative year of 2022, annual mean concentrations of NO_2 range from 12.1 µg/m^3 to 27.9 µg/m^3. Therefore, it will be important that the air quality assessment for the proposed development looks at the potential effects of traffic generated by development upon existing dwellings adjacent to local roads to establish that there will be no adverse effects upon their existing standards of air quality. This matter is covered in the following section.

4.5 In conclusion, air quality in CDC area is generally improving with monitoring concentrations reducing year on year, and concentrations below the objective level are being monitored within Bicester, especially AQMA No. 4.

4.6 Nevertheless, it will be important that the air quality assessment for the proposed development looks at potential effects of traffic generated by development upon existing dwellings adjacent to local roads to establish that there will be no adverse effects upon their existing standards of air quality. This matter is covered in the following sections.

5.0 METHODOLOGY

General

5.1 The assessment has been undertaken using the atmospheric dispersion modelling package ADMS-Roads Air Quality Management System Version 5.1, developed by Cambridge Environmental Research Consultants Ltd (CERC), to establish air pollutant concentrations at the proposed development.

5.2 The assessment has been undertaken with reference to guidance set out within Defra's LAQM.TG(22), the IAQM and EPUK's 'Guidance on Land-Use Planning and Development Control: Planning for Air Quality 2017 (v1.2)'.

5.3 Specifically, ADMS-Roads has been used to disperse emissions of NO_x, PM_{10} and $PM_{2.5}$ from local road sources and derive resultant road contributions to the concentrations of these pollutants at specific existing receptor locations. When added to the background concentration, this provides an indication of the resulting air quality at each receptor location.

5.4 The ADMS-Roads model requires the input of background pollutant concentration data, hourly traffic flows, annual average vehicle speed, vehicle classification broken down into light and heavy duty vehicles (LDV/HDV), information on the type of road and meteorological data (model inputs are discussed in turn later).

5.5 Current guidance has led to some changes in the way in which NO_2 concentrations should be modelled. In accordance with LAQM.TG(22) the ADMS-Roads model has been used to derive road-based concentrations of NO_x at specific receptor locations. To convert the modelled road-based NO_x to annual NO_2 the 'NO_x to NO_2' calculator (Version 8.1) (available from https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/) has been applied to all modelled results.

Assessment Scenarios

5.6 The assessment seeks to establish air pollutant concentrations at identified receptor locations as shown in **Appendix D**. The following scenarios, informed by available CBC NO_2 monitoring data and the Transport Assessment work, have been included in the assessment:

- 2022 Verification;
- 2026 Base (i.e., Future Baseline);
- 2026 'Do Nothing' (2026 DN), (i.e., 2026 Base + Committed Development);
- 2026 'Do Something' (2026 DS), (i.e. 2026 DN + Proposed Development);
- 2031 Base (i.e., Future Baseline);
- 2031 'Do Nothing' (2031 DS), (i.e., 2031 Base + Committed Development); and
- 2031 'Do Something' (2031 DS) (i.e. 2031 DN + Proposed Development);

5.7 The future year scenario has been modelled using future year traffic flow data, together with 2023 background and emissions data, to account for current uncertainty in future year projections. Background concentrations

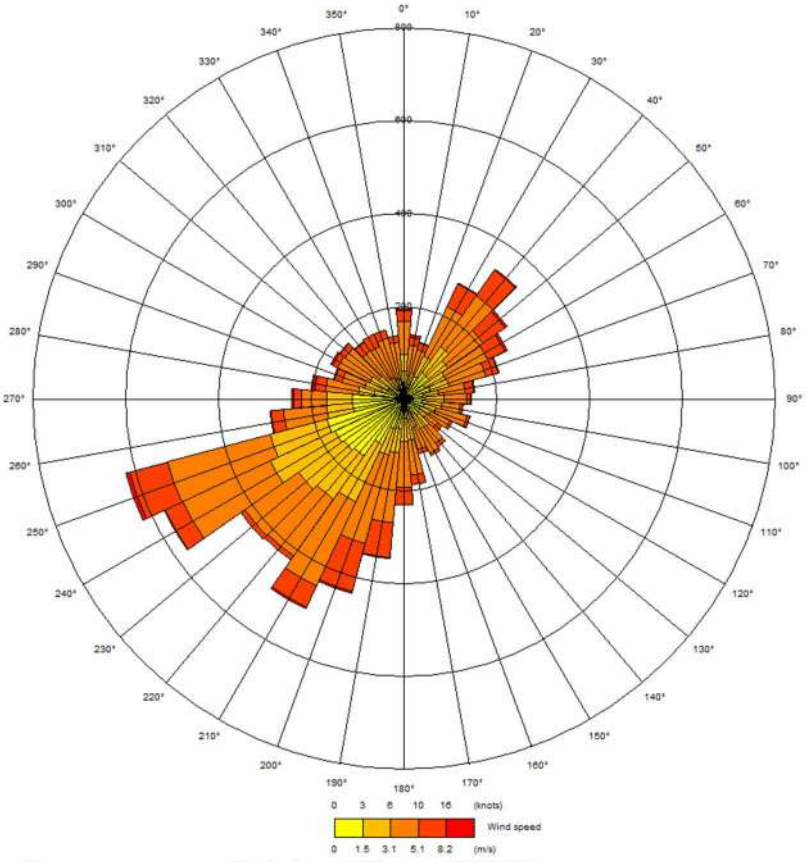
and vehicle emission factors are projected to decrease year on year due to fleet composition and technological changes. Using 2023 data therefore provides a conservative case for the future scenarios.

Meteorology

5.8 The closest meteorological station to the Site is located in Brize Norton, at a distance of approximately 35km from the Site.

5.9 The windrose for Brize Norton is presented in Figure 5.1. The predominant wind direction associated with the highest wind speeds is from the southwest.

Figure 5.1: Brize Norton 2022



Local Road Network

5.10 Local road sources have been input into the model using the interface between ADMS-Roads and the ADMS-Roads mapper, which enables roads to be input according to their geographic location using OS base mapping of the local area. Road/carriageway widths have been informed from OS base and aerial mapping.

Traffic Data & Emissions

5.11 To inform emissions from the road source included within the model, traffic flows for the surrounding road network have been provided by the project's Transport Consultant (PJA). The available traffic flow data, % HGV and average speed assumptions for each assessment scenario are provided in **Appendix E** for information.

5.12 Emission rates for each road source have been derived from traffic flow data using the Emission Factor Toolkit (EFT), Version 11.0, published by Defra and the devolved administrations in November 2021. The EFT is incorporated within ADMS-Roads Extra, Emissions have been calculated and included within the software. The EFT allows users to calculate road vehicle pollutant emission rates for pollutants for a specified year, road type, and vehicle speed and vehicle fleet composition.

Background Concentrations

5.13 Background concentrations of NO_2, NO_x, PM_{10} and $PM_{2.5}$ have been obtained from the 2018-based maps available on the Defra website (https://uk-air.defra.gov.uk/data/laqm-background-homel) which provide estimated background pollutant concentrations for each 1kmx1km grid square in the UK. The projections in the 2018 LAQM background maps are based on assumptions which were current before the COVID-19 outbreak in the UK. In consequence, these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

5.14 As the background maps provide data for individual pollutant sectors, those sectors relating to road traffic have been removed to avoid double counting of road emissions. As only total background concentrations are provided for NO_2, the NO_2 map has been adjusted using the online NO_2 Adjustment for NO_x Sector Removal Tool (Version 8.0), https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-adjustment-for-nox-sector-removal-tool/.

Verification

5.15 To determine how well the model is performing and to correct any over or under estimation of pollutant concentrations, LAQM.TG(22) recommends a verification process that should be applied. Verification involves a comparison between predicted and measured 'road traffic contributions' at one or more local sites and adjustment of the modelled concentrations if necessary.

5.16 CDC's monitored results used within the verification process are shown in Table 5.1 below.

Table 5.1: CDC Monitoring Data Used in Verification

Site ID	OS Co-ordinates	Annual Mean Concentrations (µg/m^3)
		2022
DT32	458333, 224432	12.1
DT36	458214, 222836	26.8
DT37	458274, 222935	27.9

5.17 The derived adjustment factor is 3.7, and has been applied to all modelled road contribution NO_x, PM_{10} and $PM_{2.5}$. Details of this verification process are included in **Appendix F.** In order to get to the verification factor shown above, a reduction of assumed road speeds along the existing roads has been applied.

5.18 In addition to this, a Root Mean Square Error (RMSE) has been calculated to determine the error within the calculations. The calculations for the RMSE are also provided in **Appendix F**. The calculated RMSE is 3.0 µg/m^3, which correlates to an error ratio of 8%. The RMSE means that modelled results could be under or over predicting pollution concentrations by between +/- 3.0 µg/m^3.

5.19 It is considered that any attempts to reduce the verification factor further would not be representative of the real world conditions the links in question, which would be unrepresentative of the average daily speed on the relevant roads. Nevertheless, a calculated RMSE of below 10% is deemed to be ideal.

6.0 AIR QUALITY ASSESSMENT

General

6.1 This section of the report outlines the findings of the assessment discussed in Section 5.0. Having established the likely change in pollutant concentrations arising from the 'do something' assessment scenarios, the potential local air quality impact of the proposed development has been described using the approach set out in the IAQM and EPUK 'Guidance on Land-Use Planning and Development Control: Planning for Air Quality 2017'.

6.2 EPUK Guidance suggests a two stage process to be followed in the assessment:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- A judgement on the overall significance of the effects of any impacts.

6.3 For air quality impacts on the surrounding area (i.e., existing receptors), a practical way of assigning a meaningful description to the degree of an impact is to express the magnitude of incremental change as a proportion of the relevant assessment level and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion. The suggested IAQM/EPUK framework for describing the impacts on the basis set out above is shown in Table 6.1 below.

Table 6.1: Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL*)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

*AQAL = Air Quality Assessment Level 40µg/m^3

Results

6.4 The findings of the assessment of pollutant concentrations at each of the receptor locations for the modelled scenarios are discussed below.

6.5 These results should be compared with the objectives listed in Table 3.1, and summarised as follows:

- NO_2 average annual mean not to exceed 40 µgm^3;
- PM_{10} average annual concentrations not to exceed 40 µgm^3; and
- $PM_{2.5}$ average annual concentrations not to exceed 20 µgm^3.

Nitrogen Dioxide (NO_2)

6.6 The results in **Appendix G** indicate that for a baseline do-nothing scenario for all assessment year, receptors adjacent to all roads have values below the current annual mean air quality objectives (40 µg/m^3) for NO_2, which is consistent CBC's air quality and review data.

6.7 With traffic generated by development, i.e., the do-something scenario for all assessment years, the absolute concentrations remain below the current air quality objectives and the incremental change due to traffic generated by the development is small (0.42 µg/m^3 or less to annual mean concentrations of NO_2), which would not have a significant impact upon local air quality.

6.8 The impact significance in accordance with EPUK/IAQM guidance is also presented in **Appendix G** for each receptor. For all assessed receptors, impact due to development is classed as 'Negligible' and none of the changes exceed 1% of the AQAL.

6.9 With regard to the 1-hour mean objective LAQM.TG(22) advises that *"A study carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3"*. As the results in **Appendix G** indicate annual mean concentrations of NO_2 will remain below 60 µg/m^3, it is considered that the NO_2 1-hour objective will not be exceeded at any receptor.

Particulate Matter (PM_{10})

6.10 The modelled annual mean concentrations of PM_{10} are also presented in **Appendix G**. The results indicate that annual PM_{10} concentrations are predicted to remain well below the objective for all receptor locations and for all scenarios. The incremental change due to traffic generated by the development is small (less than 0.11 µg/m^3 to annual mean concentrations PM_{10}), which would not have a significant impact upon local air quality.

6.11 The impact significance in accordance with EPUK/IAQM guidance indicates that for all receptors, impact due to development is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.

Particulate Matter ($PM_{2.5}$)

6.12 The modelled annual mean concentrations of $PM_{2.5}$ are also presented in **Appendix G**. The 2026 results indicate that annual $PM_{2.5}$ concentrations are predicted to remain well below the objective for all receptor locations and for all scenarios. The incremental change due to traffic generated by the development is small (0.05 µg/m^3 or less to annual mean concentrations $PM_{2.5}$), which would not have a significant impact upon local air quality.

6.13 The impact significance in accordance with EPUK/IAQM guidance indicates that for all receptors, impact due to development is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.

6.14 As per the objective levels shown in Table 3.1 the 2031 scenarios have been assessed against the interim target level of 12 µg/m^3.

6.15 For the predicted 2031 $PM_{2.5}$ emissions, the results indicate that annual $PM_{2.5}$ concentrations are predicted to remain below the interim target at the majority of receptor locations. The concentrations at three receptors (11, 12 and 19) are predicted to exceed the interim target. The modelling shows that the exceedances are predicted with and without development traffic. The incremental change due to traffic generated by the development is small (less than 0.06 µg/m^3 to annual mean concentrations $PM_{2.5}$), which would not have a significant impact upon local air quality.

6.16 The impact significance in accordance with EPUK/IAQM guidance indicates that for all receptors, impact due to development is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.

6.17 It should be noted that modelling has been undertaking using 2023 backgrounds and emissions, representing a robust scenario. Concentrations are likely to be lower with future background concentrations and emissions.

6.18 Since the air quality assessment indicates that the proposed development will not lead to new exceedances of the annual mean air quality objective, and the changes due to traffic generated by development are small and not significant, it can be concluded that the air quality at the Site is acceptable for residential development, and that development traffic will not lead to a significant adverse impact upon existing air quality.

Construction Dust Risk Assessment

6.19 Nuisance dust impacts are likely to be temporary and episodic (most noticeable during dry windy conditions) and would not persist beyond completion of construction.

6.20 Where dust raising activities are present for 12 months or more, dust complaints are considered to be very likely for those closest receptors to the Site that lie between 10-30m from the Site boundary. Therefore, appropriate dust mitigation measures will be required to minimize dust emissions from the Site.

6.21 In addition, the qualitative dust assessment criteria in Table 3.2 indicates that existing premises adjacent to the Site will lie within the zone for potentially significant effects for soiling and ambient concentrations of PM_{10}.

6.22 Applying IAQM risk assessment procedures as set out in **Appendix C** requires an assessment where there are sensitive receptors within 350m of the Site boundary of the works and/or within 100m of the routes used by construction vehicles on the public highway up to 500m from the Site entrance. Existing premises fall within 350m zone which triggers the initial screening criterion.

6.23 The stages considered by the dust risk assessment are presented in Table 6.2. The assessments and conclusions are based upon the classifications for a ' small' construction site for the 'demolition' phase, because the total working area is likely to be below 20,000m^3. For the 'earthworks' and 'construction' phases the site categorised as 'large', because the total working area for the various activities may be more than the relevant thresholds. However, not all of the Site would require intensive earthworks, nor would it require large

numbers of plant or significant amounts of spoil removal, nor are the types of construction work or soil conditions likely to lead to anything more than being 'moderately dusty'.

6.24 Due to the overall size of the Site, it is possible that the number of heavy duty vehicles visiting the Site/day may exceed 50, and the distances of unpaved roads on the Site are likely to be greater than 100m, therefore, the Site is classified as 'large' large in relation to the risk of dust being tracked out of the Site.

Table 6.2: Dust Risk Assessment

Step	Consideration	Demolition	Earthworks	Construction	Track-out
2a	Scale/nature of works	Small	Large	Large	Large
2b	Sensitivity of area:				
	To dust soiling	Medium	Medium	Medium	Medium
	To PM10 health effects	Low	Low	Low	Low
	To ecological effects	-	-	-	-
2c	Risk of impacts	Low Risk	Medium Risk	Medium Risk	Medium Risk

6.25 The assessments in Table 6.2 and the IAQM matrices have been used to define the Site-specific mitigation requirements for the construction phases and the overall risk assessment for dust from the construction works is summarised in Table 6.3

Table 6.3: Summary Dust Risk Table to define Site-Specific Mitigation

Source	Dust Soiling Effects	PM10 Effects	Ecological Effects
Demolition	Low Risk	Negligible	-
Earthworks	Medium Risk	Low Risk	-
Construction	Medium risk	Low Risk	-
Track-out	Medium Risk	Low Risk	-

6.26 With regard to dust soiling, the risk assessment indicates that on the basis of no mitigation being present, for the demolition phase would be 'Low risk' and for Earthworks, Construction and Track-out Phases would present a 'Medium Risk'.

6.27 With regard to PM_{10} effects, the risk assessment indicates that on the basis of no mitigation being present, the earthworks, construction and track-out phases would present a 'Low Risk' to health. Where as the Demolition phase would present a 'Negligible' risk to health.

6.28 The IAQM guidance on the mitigation measures needed to deal with low, medium or high risk effects is set out in **Appendix H**.

7.0 MITIGATION

7.1 Assessment has shown that the annual mean air quality objectives will be met at the majority of the most exposed receptor locations and will not lead to any new exceedances of the annual mean objective levels, and the Site is acceptable for residential development. It is therefore considered that development-specific mitigation will not be required.

7.2 Nevertheless, to assist in offsetting incremental creep in pollutant emissions, a number of sustainable development measures should be considered, these are follows:

- Electric vehicle charging – in accordance with Approved Document S, adopted in June 2022;
- Low NO_x heating and boilers;
- Monitored Travel Plan;
- Measures to support public transport infrastructure and promote use; and
- Measures to support cycling and walking infrastructure.

Construction Dust

7.3 It is recommended that the relevant mitigation presented in **Appendix H**, appropriate for a 'Medium Risk' site, should be routinely included in the Site's dust management plan for the relevant phase of construction. Key measures known to minimise dust emissions and represent good practice guidance are summarised in Table 7.1.

Table 7.1: Key Dust Mitigation Measures

Aspect	Mitigation Measures
Site Planning	No bonfires
	Plan site layout - machinery and dust causing activities should be located away from sensitive receptors
Construction Traffic	All vehicles should switch off engines when not in active use – no idling vehicles
	Wash or clean all vehicles effectively before leaving the site if close to sensitive receptors
	All loads entering and leaving site to be covered
	No site runoff of water or mud
	All non-road mobile machinery (NRMM) to use ultra low sulphur tax-exempt diesel (ULSD) where available
Demolition Works	Use water as dust suppressant
	Cutting equipment to use water as suppressant or suitable local exhaust ventilation systems
	Securely cover skips and minimize drop heights
Site Activities	To employ best practicable means in the control of dust
	Minimise dust generation activities
	Use water as dust suppressant where possible
	Keep stockpiles for the shortest possible times
Site Management	Appointment of a site agent whose contact details are provided to the LPA's Environmental Health Department and local residents prior to construction works starting.
	Agent to provide immediate response to any complaints by logging details of complaint and investigating source of complaint to establish whether routine mitigation measures

Aspect	Mitigation Measures
	have been properly implemented. If necessary, appropriate steps to be taken to mitigate against any adverse effects, and details of actions to be logged.

8.0 CONCLUSIONS

8.1 MEC, has been commissioned by Richborough to undertake an Air Quality Assessment for a proposed residential development on Land west of Fringford Road, Caversfield.

8.2 This Air Quality Assessment seeks to examine the impact of local road traffic emissions upon existing receptors adjacent to local roads, and future sensitive receptors on the Site. The key traffic related pollutants considered are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

8.3 The assessment has been undertaken with reference to the advice provided within the Land-Use Planning and Development Control: Planning for Air Quality, 'Guidance from Environmental Protection UK, the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes', May 2017, and the 'Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance' 2014.

8.4 The following scenarios have been included in the assessment:

- 2022 Verification;
- 2026 Base (i.e., Future Baseline);
- 2026 'Do Nothing' (2026 DN), (i.e., 2026 Base + Committed Development);
- 2026 'Do Something' (2026 DS), (i.e. 2026 DN + Proposed Development);
- 2031 Base (i.e., Future Baseline);
- 2031 'Do Nothing' (2031 DS), (i.e., 2031 Base + Committed Development); and
- 2031 'Do Something' (2031 DS) (i.e. 2031 DN + Proposed Development);

8.5 The future year scenarios have been modelled using future traffic flow data, together with 2023 background and emissions data, to account for current uncertainty in future year predictions.

8.6 The model has been verified using 2022 NO_2 monitoring data provided by CBC. The verification has derived an adjustment factor of 3.7, which has been applied to all modelled outputs.

8.7 The assessment results indicate that annual mean NO_2 concentrations are predicted to remain below the annual mean objective at all assessed receptor locations.

8.8 With regard to impact, assessment shows that the development will not lead to an exceedance of the objective at any receptor location. Relative to the Air Quality Assessment Levels (AQAL) of the latest EPUK and IAQM guidance, the development's impact on local NO_2 concentrations is defined as 'Negligible' for all assessed receptors and none of the changes exceed 1% of the AQAL.

8.9 With regard to the 1-hour mean objective LAQM.TG(22) advises that *"A study carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3"*. As the results indicate annual mean concentrations of NO_2 will

remain well below 60 µg/m^3, it is considered that the NO_2 1-hour objective will not be exceeded at any receptor.

8.10 Annual mean PM_{10} concentrations are also expected to remain below the annual mean objective at all assessed receptor locations, and the development's impact on local concentrations is defined as 'Negligible' for all assessed receptors. None of the changes exceed 1% of the AQAL.

8.11 Annual Mean $PM_{2.5}$ concentrations are predicted to remain below the objective for all receptor locations and the development's impact on local concentrations is defined as 'Negligible' for all assessed receptors. None of the changes exceed 1% of the AQAL.

8.12 With regard to 2031 $PM_{2.5}$ emissions, the results indicate that annual $PM_{2.5}$ concentrations are predicted to remain below the interim target at the majority of receptor locations. There are three receptor locations which are predicted to exceed the interim target in the Do Nothing and Do Something scenarios. However, the developments impacts on local concentrations is defined as 'Negligible' for all assessed receptors. None of the changes exceed 1% of the AQAL.

8.13 The impact significance in accordance with EPUK/IAQM guidance indicates that for all receptors, impact due to development is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.

8.14 Therefore, since the actual changes due to traffic generated by development are small and not significant and since the development will not lead to any new exceedances of the annual mean objective level at the most exposed receptor locations, it can be concluded that the air quality at the Site is acceptable for development, and that development traffic will not lead to significant adverse impact upon existing air quality.

8.15 Mitigation measures have been proposed to minimise the potential effects associated with increased air pollutant concentrations.

8.16 With regard to dust soiling, the risk assessment indicates that on the basis of no mitigation being present, for the demolition phase would be 'Low risk' and for Earthworks, Construction and Track-out Phases would present a 'Medium Risk'.

8.17 With regard to PM_{10} effects, the risk assessment indicates that on the basis of no mitigation being present, the earthworks, construction and track-out phases would present a 'Low Risk' to health. Where as the Demolition phase would present a 'Negligible' risk to health.

8.18 The relevant mitigation measures presented in the IAQM guidance for a 'Medium Risk' site should be routinely included in the Site's dust management plan for the relevant earthworks, construction and track-out phases.

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APPENDICES

APPENDIX A

PLANNING

- Site boundary
- 1 Proposed vehicular/cycle/pedestrian access
- 2 Proposed emergency/pedestrian & cycle access
- 3 Primary tree lined street
- 4 Secondary street
- 5 Village mews
- 6 Private lane/drive
- 7 Shared surface
- 8 Informal courtyard with agricultural theme
- 9 Historic track alignment
- 10 Cycle way
- 11 Play space (LEAP)
- 12 Natural play/ trail space
- 13 Sustainable drainage
- 14 Entrance green (wildflower planting)
- 15 Planted swale corridor
- 16 Existing vegetation retained and enhanced as necessary
- 17 Mown path
- 18 Open grassland
- 19 Community orchard
- 20 Garden Common
- 21 Natural open space
- 22 Soft development edge
- 23 Area to be fenced off for ecology/ wildlife
- 24 Drop bollards

Rev.	Date	Description

Land West of Fringford Road
CAVERSFIELD

Illustrative Masterplan

Job ref:	Drawing number:	Revision:
501	P07	-
Scale: 1:1,500 @ A3	Date: December 2023	

edge URBAN DESIGN

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APPENDICES

APPENDIX B

DEFINITION OF AIR QUALITY TERMS AND UNITS

ppm	parts per million - defines the units of pollution in every million (10^6) units of air.
ppb	parts per billion - defines the units of pollution in every billion (10^9) units of air.
$\mu g/m^3$	microgrammes per cubic metre - one microgramme is one millionth of a gram.
ng/m^3	nanogrammes per cubic metre – one nanogramme is one milliardth (i.e. one thousand millionth of a gram (10^{-9}))
Annual mean	the average of the concentrations measured for one year.
1-hour mean	the average of the concentrations measured for one hour.
24-hour mean	the average of the concentrations measured for twenty four hours.
Running mean	the mean or series of means calculated for overlapping time periods. For example, an 8-hour running mean is calculated every hour and averages the values for eight hours. The period of averaging is stepped forward by one hour for each subsequent value so that a degree of overlap exists between successive values. Non-running means are calculated for consecutive time periods so that there is no overlap.
Percentile	a value that establishes a particular threshold in a collection of data. For example, the 90^{th} percentile of yearly values is the value that 90% of all the data in the year fall below or equal.
Exceedance	a period of time when the concentration of a pollutant is greater than, or equal to, the relevant air quality standard.

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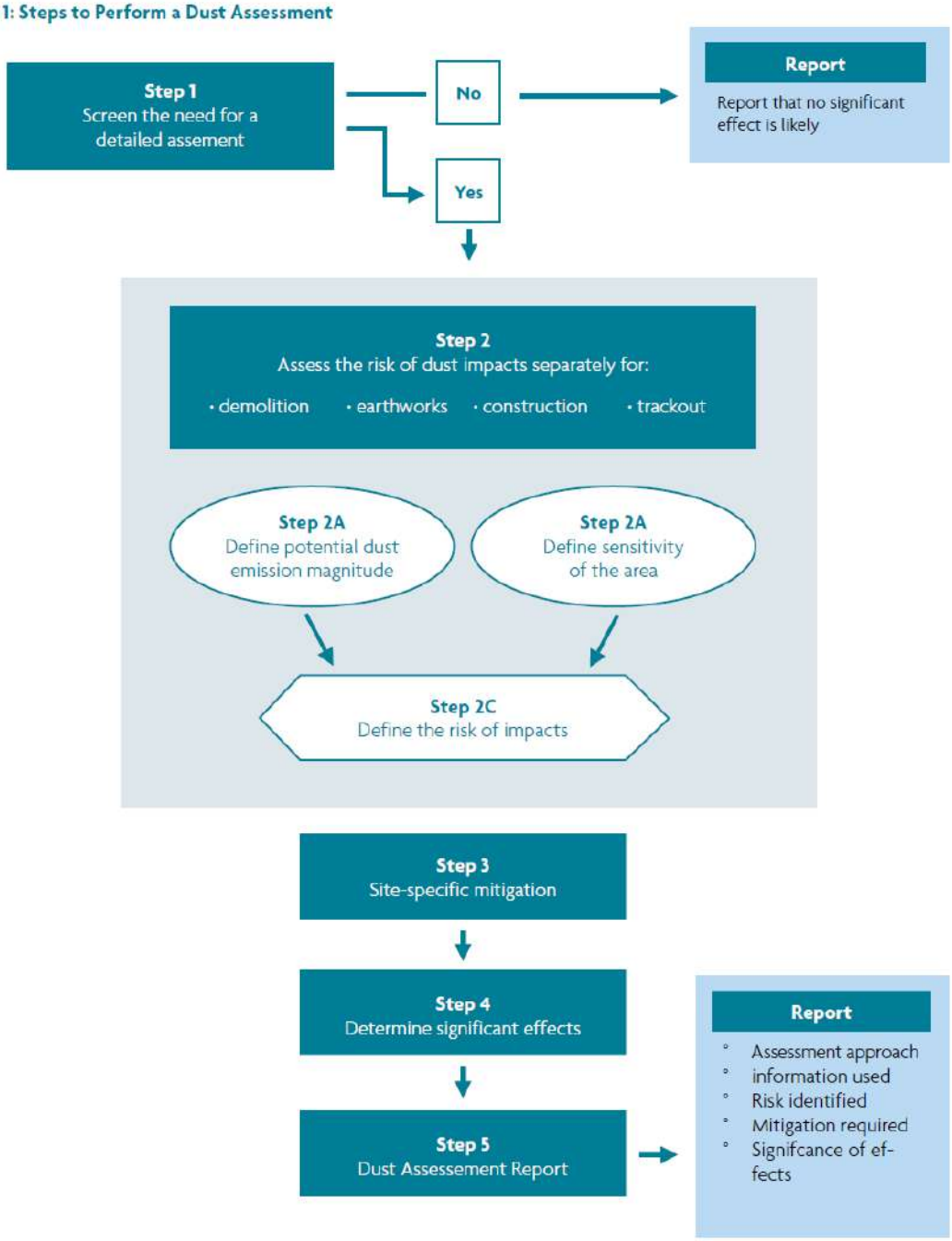
APPENDICES

APPENDIX C

Figure 1: Steps to Perform a Dust Assessment



Demolition

Examples:

- **Large**: Total building volume >50 000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- **Medium**: Total building volume 20 000 m^3 – 50 000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- **Small**: Total building volume <20 000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks

Examples:

- **Large**: Total site area >10 000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100 000 tonnes;
- **Medium**: Total site area 2 500 m^2 – 10 000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20 000 tonnes – 100 000 tonnes; and
- **Small**: Total site area <2 500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10 000 tonnes, earthworks during wetter months.

Construction

Examples:

- **Large**: Total building volume >100 000 m^3, piling, on site concrete batching; sandblasting
- **Medium**: Total building volume 25 000 m^3 – 100 000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching; and
- **Small**: Total building volume <25 000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

Examples:

- **Large:** >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium:** 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road lengths 50m-100m;
- **Small:** <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

These numbers are for vehicles that leave the site after moving over unpaved ground, where they will accumulate mud and dirt that can be tracked out onto the public highway.

Table 2: Sensitivity of the Area to Dust Soiling Effects on People and Property [a b]

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)[c]			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

[a] The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout. See **STEP 2B**, **Box 6** and **Box 9**.

[b] Estimate the total number of receptors within the stated distance. Only the *highest level* of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors < 20m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors < 50 m is 102. The sensitivity of the area in this case would be high.

[c] For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50m from the edge of the road.

Table 3: Sensitivity of the Area to Human Health Impacts [a b]

Receptor Sensitivity	Annual Mean PM_{10} concentration[c]	Number of Receptors[d]	Distance from the Source (m)[e]				
			<20	<50	<100	<200	<350
High	>32 µg/m³ (>18 µg/m³ in Scotland)	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m³ (16-18 µg/m³ in Scotland)	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m³ (14-16 µg/m³ in Scotland)	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³ (<14 µg/m³ in Scotland)	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

[a] The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout. See **STEP 2B**, **Box 7** and **Box 9**.

[b] Estimate the total within the stated distance (e.g. the total within 350m and not the number between 200 and 350m), noting that only the highest level of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors < 20m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors < 50 m is 102. If the annual mean PM_{10} concentration is 29µg/m³, the sensitivity of the area would be high.

[c] Most straightforwardly taken from the national background maps, but should also take account of local sources. The values are based on 32µg/m³ being the annual mean concentration at which an exceedence of the 24-hour objective is likely in England, Walesand Northern Ireland. In Scotland there is an annual mean objective of 18µg/m³.

[d] In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties

[e] For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table 4: Sensitivity of the Area to Ecological Impacts [a b]

Receptor Sensitivity	Distance from the Source (m)[c]	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

[a] The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout and for each designated site. See **STEP 2B**, **Box 8** and **Box 9**.

[b] Only the highest level of area sensitivity from the table needs to be considered.

[c] For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site.

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APPENDICES

APPENDIX D

27877 - Aunt Elms Lane, Caversfield

Verification Receptor Locations

27877 - Aunt Elms Lane, Caversfield

Receptor Locations

27877 - Aunt Elms Lane, Caversfield

Receptor Locations S1-S5 and 1-10

27877 - Aunt Elms Lane, Caversfield

Receptor Locations 11-17

27877 - Aunt Elms Lane, Caversfield

Receptor Locations 18-21

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APPENDICES

APPENDIX E

2022 Verification

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	12892	12297	512	5%	595	25	20-55	6
2	B4100 (S)	12710	12120	505	5%	590	25	20-55	6-12
3	B4100 Banbury Road	6557	6251	260	5%	306	13	10-50	6-12
4	Aunt Ems Lane	1482	1470	61	1%	12	1	15-50	5
5	Fringford Road (N)	3108	3096	129	0%	12	1	25-50	6
6	Fringford Road (S)	1950	1944	81	0%	6	0	15-50	6
7	A4095 (W)	15448	15240	635	1%	208	9	15-60	10-12
8	A4095 (E)	20432	20157	840	1%	275	11	15-60	10-14

2026 Base

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13072	12469	520	5%	603	25	20-55	6
2	B4100 (S)	12935	12338	514	5%	597	25	20-55	6-12
3	B4100 Banbury Road	6650	6340	264	5%	310	13	10-50	6-12
4	Aunt Ems Lane	1502	1490	62	1%	12	1	15-50	5
5	Fringford Road (N)	3151	3139	131	0%	12	1	25-50	6
6	Fringford Road (S)	1978	1972	82	0%	6	0	15-50	6
7	A4095 (W)	15666	15455	644	1%	211	9	15-60	10-12
8	A4095 (E)	20948	20666	861	1%	282	12	15-60	10-14

2026 Do Nothing (2026 Base + Committed Development)

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13691	13081	545	4%	610	25	20-55	6
2	B4100 (S)	15241	14621	609	4%	620	26	20-55	6-12
3	B4100 Banbury Road	7037	6723	280	4%	314	13	10-50	6-12
4	Aunt Ems Lane	1502	1490	62	1%	12	1	15-50	5
5	Fringford Road (N)	3151	3139	131	0%	12	1	25-50	6
6	Fringford Road (S)	1978	1972	82	0%	6	0	15-50	6
7	A4095 (W)	17756	17524	730	1%	232	10	15-60	10-12
8	A4095 (E)	21515	21227	884	1%	288	12	15-60	10-14

2026 Do Something (2026 DN + Proposed Development)

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13755	13145	548	4%	610	25	20-55	6
2	B4100 (S)	15241	14621	609	4%	620	26	20-55	6-12
3	B4100 Banbury Road	7172	6856	286	4%	316	13	10-50	6-12
4	Aunt Ems Lane	1555	1543	64	1%	12	1	15-50	5
5	Fringford Road (N)	3215	3203	133	0%	12	1	25-50	6
6	Fringford Road (S)	2592	2579	107	1%	13	1	15-50	6
7	A4095 (W)	18162	17926	747	1%	236	10	15-60	10-12
8	A4095 (E)	21588	21300	888	1%	288	12	15-60	10-14

2031 Base

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13120	12515	521	5%	605	25	20-55	6
2	B4100 (S)	12934	12335	514	5%	599	25	20-55	6-12
3	B4100 Banbury Road	6676	6364	265	5%	312	13	10-50	6-12
4	Aunt Ems Lane	1507	1495	62	1%	12	1	15-50	5
5	Fringford Road (N)	3162	3150	131	0%	12	1	25-50	6
6	Fringford Road (S)	1985	1979	82	0%	6	0	15-50	6
7	A4095 (W)	15726	15514	646	1%	212	9	15-60	10-12
8	A4095 (E)	21024	20742	864	1%	282	12	15-60	10-14

2031 Do Nothing (2031 Base + Committed Developments)

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13739	13127	547	4%	612	26	20-55	6
2	B4100 (S)	15240	14618	609	4%	622	26	20-55	6-12
3	B4100 Banbury Road	7063	6747	281	4%	316	13	10-50	6-12
4	Aunt Ems Lane	1507	1495	62	1%	12	1	15-50	5
5	Fringford Road (N)	3162	3150	131	0%	12	1	25-50	6
6	Fringford Road (S)	1985	1979	82	0%	6	0	15-50	6
7	A4095 (W)	17816	17583	733	1%	233	10	15-60	10-12
8	A4095 (E)	21591	21303	888	1%	288	12	15-60	10-14

2031 Do Something (2031 DN + Proposed Development)

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed KPH	Link width (m)
1	B4100 (N)	13803	13191	550	4%	612	26	20-55	6
2	B4100 (S)	15240	14618	609	4%	622	26	20-55	6-12
3	B4100 Banbury Road	7198	6880	287	4%	318	13	10-50	6-12
4	Aunt Ems Lane	1560	1548	65	1%	12	1	15-50	5
5	Fringford Road (N)	3226	3214	134	0%	12	1	25-50	6
6	Fringford Road (S)	2599	2586	108	1%	13	1	15-50	6
7	A4095 (W)	18222	17985	749	1%	237	10	15-60	10-12
8	A4095 (E)	21664	21376	891	1%	288	12	15-60	10-14

27877 - Aunt Elms Lane, Caversfield

Modelled Roads

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APPENDICES

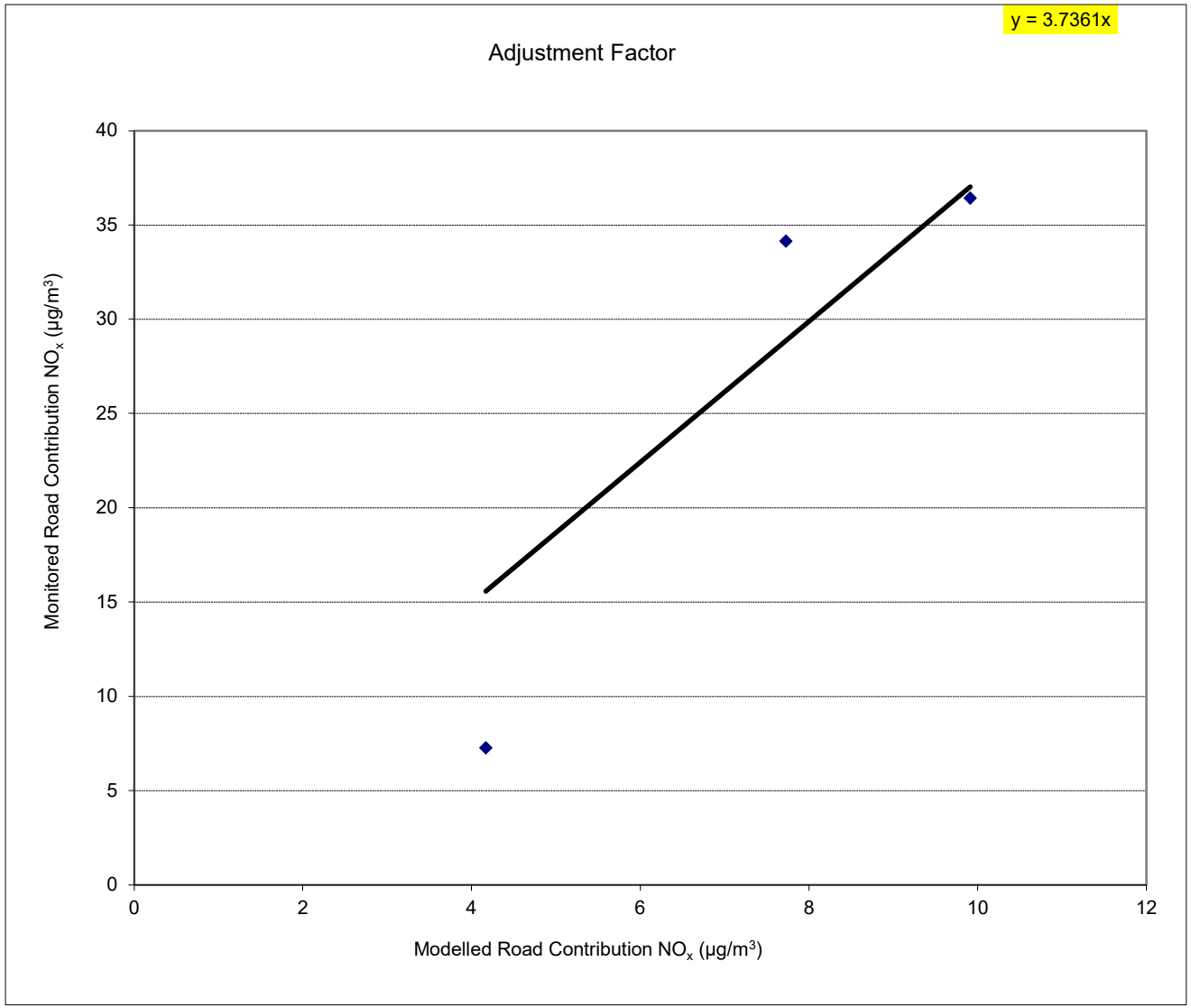
APPENDIX F

Verification (LAQM.TG 22)

	DT 32	DT 36/37
Background NO_2	8.09	9.09
Background NO_x	10.46	11.87

Site ID	Location		Modelled Road Contribution NO_x (ex-background)	Monitored Total NO_2	Monitored Road Contribution Nox*	Monitored Total NO_x	Ratio of Monitored Road Contribution NO_x / Modelled Road Contribution NO_x
	X (m)	Y (m)					
DT32	458333	224432	4.16917	12.1	7.27	17.7	1.7
DT36	458214	222836	7.73	26.8	34.13	46.0	4.4
DT37	458274	222935	9.91	27.9	36.42	48.3	3.7

Verification Factor	3.7


y = 3.7361x
Adjustment Factor
Monitored Road Contribution NOx (µg/m3)
Modelled Road Contribution NOx (µg/m3)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12

Root Mean Square Error (RMSE)

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(Obs_i - Pred_i)^2}$$

Name	Observations	Predictions	Observations – Predictions	Squared
CB76	12.1	16.5	-4.4	19.36
CB91	26.8	24.01	2.79	7.78
CB94	27.9	27.96	-0.06	0.00
			Total	27.15

27.15/3=9

√9=3.0

(3.0/40)x100=8%

MEC
Development Technical Consultants

APPENDICES

APPENDIX G

2026 NO_2												
Receptor Name	X(m)	Y(m)	Z(m)	2026 Base	2026 DN	2026 DS	DS-DN	% Change	AQAL 2026 Base	AQAL 2026 DN	AQAL 2026 DS	Impact Descriptor
32	458333	224432	2.5	15.67	16.02	16.11	0.09	0%	39%	40%	40%	Negligible
36	458214	222836	2.5	22.37	22.95	23.16	0.21	1%	56%	57%	58%	Negligible
37	458274	222935	2.5	25.99	26.66	26.91	0.25	1%	65%	67%	67%	Negligible
S1	458280.2	225005.9	1.5	11.9	12.28	12.30	0.02	0%	30%	31%	31%	Negligible
S2	458346.4	224955.9	1.5	11.2	11.50	11.53	0.03	0%	28%	29%	29%	Negligible
S3	458430	224901.8	1.5	11.34	11.60	11.66	0.06	0%	28%	29%	29%	Negligible
S4	458545.9	225031.9	1.5	10.68	10.84	10.88	0.04	0%	27%	27%	27%	Negligible
S5	458522.9	224995	1.5	10.51	10.68	10.73	0.05	0%	26%	27%	27%	Negligible
1	458483	224845	1.5	15.11	15.37	15.67	0.30	1%	38%	38%	39%	Negligible
2	458508	224888	1.5	13.12	13.32	13.46	0.14	0%	33%	33%	34%	Negligible
3	458626	225063	1.5	13.5	13.62	13.70	0.08	0%	34%	34%	34%	Negligible
4	458098	224943	1.5	16.74	17.98	17.99	0.01	0%	42%	45%	45%	Negligible
5	458098	224736	1.5	16.82	18.04	18.07	0.03	0%	42%	45%	45%	Negligible
6	458113	224644	1.5	17.76	19.06	19.11	0.05	0%	44%	48%	48%	Negligible
7	458026	225236	1.5	17.16	17.55	17.59	0.04	0%	43%	44%	44%	Negligible
8	457915	225317	1.5	14.48	14.77	14.80	0.03	0%	36%	37%	37%	Negligible
9	457909	225373	1.5	19.71	20.17	20.23	0.06	0%	49%	50%	51%	Negligible
10	457874	225359	1.5	13.74	14.00	14.03	0.03	0%	34%	35%	35%	Negligible
11	458228	224471	1.5	28.96	29.86	30.08	0.22	1%	72%	75%	75%	Negligible
12	458339	224456	1.5	22.53	23.04	23.16	0.12	0%	56%	58%	58%	Negligible
13	458114	224432	1.5	18.84	19.91	20.11	0.20	0%	47%	50%	50%	Negligible
14	457996	224376	1.5	18.66	19.90	20.13	0.23	1%	47%	50%	50%	Negligible
15	458148	224400	1.5	16.63	17.29	17.45	0.16	0%	42%	43%	44%	Negligible
16	458188	224323	1.5	17.73	18.28	18.46	0.18	0%	44%	46%	46%	Negligible
17	458147	224324	1.5	13.35	13.73	13.83	0.10	0%	33%	34%	35%	Negligible
18	458250	223342	1.5	14.41	14.70	14.81	0.11	0%	36%	37%	37%	Negligible
19	458280	222977	1.5	32.88	33.80	34.14	0.34	1%	82%	85%	85%	Negligible
20	458261	222943	1.5	22.69	23.28	23.50	0.22	1%	57%	58%	59%	Negligible
21	458236	222903	1.5	20.5	21.02	21.22	0.20	0%	51%	53%	53%	Negligible

2026 PM_{10}												
Receptor Name	X(m)	Y(m)	Z(m)	2026 Base	2026 DN	2026 DS	DS-DN	% Change	AQAL 2026 Base	AQAL 2026 DN	AQAL 2026 DS	Impact Descriptor
32	458333	224432	2.5	16.49	16.59	16.61	0.02	0%	41%	41%	42%	Negligible
36	458214	222836	2.5	17.20	17.33	17.38	0.05	0%	43%	43%	43%	Negligible
37	458274	222935	2.5	17.42	17.56	17.61	0.05	0%	44%	44%	44%	Negligible
S1	458280.2	225005.9	1.5	15.14	15.25	15.25	0.01	0%	38%	38%	38%	Negligible
S2	458346.4	224955.9	1.5	15.29	15.37	15.38	0.01	0%	38%	38%	38%	Negligible
S3	458430	224901.8	1.5	15.32	15.38	15.40	0.02	0%	38%	38%	39%	Negligible
S4	458545.9	225031.9	1.5	14.80	14.84	14.85	0.01	0%	37%	37%	37%	Negligible
S5	458522.9	224995	1.5	15.10	15.14	15.15	0.01	0%	38%	38%	38%	Negligible
1	458483	224845	1.5	16.13	16.19	16.27	0.08	0%	40%	40%	41%	Negligible
2	458508	224888	1.5	15.79	15.84	15.88	0.04	0%	39%	40%	40%	Negligible
3	458626	225063	1.5	15.61	15.64	15.67	0.02	0%	39%	39%	39%	Negligible
4	458098	224943	1.5	17.02	17.39	17.39	0.00	0%	43%	43%	43%	Negligible
5	458098	224736	1.5	16.62	16.93	16.94	0.01	0%	42%	42%	42%	Negligible
6	458113	224644	1.5	16.91	17.26	17.27	0.01	0%	42%	43%	43%	Negligible
7	458026	225236	1.5	16.85	16.97	16.98	0.01	0%	42%	42%	42%	Negligible
8	457915	225317	1.5	16.12	16.21	16.22	0.01	0%	40%	41%	41%	Negligible
9	457909	225373	1.5	17.79	17.93	17.95	0.02	0%	44%	45%	45%	Negligible
10	457874	225359	1.5	15.90	15.97	15.98	0.01	0%	40%	40%	40%	Negligible
11	458228	224471	1.5	19.32	19.57	19.63	0.06	0%	48%	49%	49%	Negligible
12	458339	224456	1.5	18.59	18.74	18.77	0.04	0%	46%	47%	47%	Negligible
13	458114	224432	1.5	17.28	17.59	17.65	0.06	0%	43%	44%	44%	Negligible
14	457996	224376	1.5	17.47	17.81	17.88	0.06	0%	44%	45%	45%	Negligible
15	458148	224400	1.5	16.71	16.89	16.93	0.04	0%	42%	42%	42%	Negligible
16	458188	224323	1.5	17.23	17.39	17.44	0.05	0%	43%	43%	44%	Negligible
17	458147	224324	1.5	15.89	15.99	16.02	0.03	0%	40%	40%	40%	Negligible
18	458250	223342	1.5	16.58	16.67	16.70	0.03	0%	41%	42%	42%	Negligible
19	458280	222977	1.5	18.63	18.84	18.91	0.08	0%	47%	47%	47%	Negligible
20	458261	222943	1.5	16.86	16.98	17.02	0.05	0%	42%	42%	43%	Negligible
21	458236	222903	1.5	16.75	16.86	16.91	0.04	0%	42%	42%	42%	Negligible

2026 $PM_{2.5}$												
Receptor Name	X(m)	Y(m)	Z(m)	2026 Base	2026 DN	2026 DS	DS-DN	% Change	AQAL 2026 Base	AQAL 2026 DN	AQAL 2026 DS	Impact Descriptor
32	458333	224432	2.5	10.78	10.84	10.85	0.01	0%	54%	54%	54%	Negligible
36	458214	222836	2.5	11.20	11.27	11.30	0.03	0%	56%	56%	56%	Negligible
37	458274	222935	2.5	11.35	11.43	11.46	0.03	0%	57%	57%	57%	Negligible
S1	458280.2	225005.9	1.5	9.44	9.50	9.50	0.00	0%	47%	47%	47%	Negligible
S2	458346.4	224955.9	1.5	10.11	10.16	10.16	0.00	0%	51%	51%	51%	Negligible
S3	458430	224901.8	1.5	10.13	10.17	10.18	0.01	0%	51%	51%	51%	Negligible
S4	458545.9	225031.9	1.5	9.25	9.27	9.28	0.01	0%	46%	46%	46%	Negligible
S5	458522.9	224995	1.5	10.01	10.03	10.04	0.01	0%	50%	50%	50%	Negligible
1	458483	224845	1.5	10.59	10.63	10.67	0.05	0%	53%	53%	53%	Negligible
2	458508	224888	1.5	10.40	10.42	10.45	0.02	0%	52%	52%	52%	Negligible
3	458626	225063	1.5	9.70	9.72	9.73	0.01	0%	48%	49%	49%	Negligible
4	458098	224943	1.5	11.07	11.27	11.28	0.00	0%	55%	56%	56%	Negligible
5	458098	224736	1.5	10.86	11.04	11.04	0.00	0%	54%	55%	55%	Negligible
6	458113	224644	1.5	11.02	11.22	11.23	0.01	0%	55%	56%	56%	Negligible
7	458026	225236	1.5	10.38	10.45	10.45	0.01	0%	52%	52%	52%	Negligible
8	457915	225317	1.5	9.85	9.90	9.91	0.01	0%	49%	50%	50%	Negligible
9	457909	225373	1.5	10.78	10.86	10.87	0.01	0%	54%	54%	54%	Negligible
10	457874	225359	1.5	9.73	9.77	9.78	0.01	0%	49%	49%	49%	Negligible
11	458228	224471	1.5	12.41	12.55	12.58	0.03	0%	62%	63%	63%	Negligible
12	458339	224456	1.5	11.95	12.03	12.05	0.02	0%	60%	60%	60%	Negligible
13	458114	224432	1.5	11.23	11.40	11.43	0.03	0%	56%	57%	57%	Negligible
14	457996	224376	1.5	10.76	10.95	10.98	0.04	0%	54%	55%	55%	Negligible
15	458148	224400	1.5	10.91	11.01	11.03	0.02	0%	55%	55%	55%	Negligible
16	458188	224323	1.5	11.19	11.28	11.31	0.03	0%	56%	56%	57%	Negligible
17	458147	224324	1.5	10.45	10.51	10.52	0.02	0%	52%	53%	53%	Negligible
18	458250	223342	1.5	11.08	11.13	11.14	0.02	0%	55%	56%	56%	Negligible
19	458280	222977	1.5	12.06	12.18	12.22	0.04	0%	60%	61%	61%	Negligible
20	458261	222943	1.5	11.02	11.09	11.12	0.03	0%	55%	55%	56%	Negligible
21	458236	222903	1.5	10.94	11.01	11.03	0.02	0%	55%	55%	55%	Negligible

2031 NO_2												
Receptor Name	X(m)	Y(m)	Z(m)	2031 Base	2031 DN	2031 DS	DS-DN	% Change	AQAL 2031 Base	AQAL 2031 DN	AQAL 2031 DS	Impact Descriptor
32	458333	224432	2.5	15.69	16.05	16.14	0.09	0%	39%	40%	40%	Negligible
36	458214	222836	2.5	22.41	22.98	23.20	0.22	1%	56%	57%	58%	Negligible
37	458274	222935	2.5	26.03	26.70	26.95	0.25	1%	65%	67%	67%	Negligible
S1	458280.2	225005.9	1.5	11.9	12.26	12.32	0.06	0%	30%	31%	31%	Negligible
S2	458346.4	224955.9	1.5	11.2	11.48	11.55	0.07	0%	28%	29%	29%	Negligible
S3	458430	224901.8	1.5	11.35	11.57	11.68	0.11	0%	28%	29%	29%	Negligible
S4	458545.9	225031.9	1.5	10.68	10.84	10.90	0.06	0%	27%	27%	27%	Negligible
S5	458522.9	224995	1.5	10.51	10.68	10.74	0.06	0%	26%	27%	27%	Negligible
1	458483	224845	1.5	15.11	15.31	15.73	0.42	1%	38%	38%	39%	Negligible
2	458508	224888	1.5	13.12	13.31	13.49	0.18	0%	33%	33%	34%	Negligible
3	458626	225063	1.5	13.5	13.62	13.73	0.11	0%	34%	34%	34%	Negligible
4	458098	224943	1.5	16.74	17.98	18.00	0.02	0%	42%	45%	45%	Negligible
5	458098	224736	1.5	16.82	18.04	18.07	0.03	0%	42%	45%	45%	Negligible
6	458113	224644	1.5	17.76	19.07	19.12	0.05	0%	44%	48%	48%	Negligible
7	458026	225236	1.5	17.17	17.61	17.65	0.04	0%	43%	44%	44%	Negligible
8	457915	225317	1.5	14.49	14.82	14.85	0.03	0%	36%	37%	37%	Negligible
9	457909	225373	1.5	19.73	20.26	20.31	0.05	0%	49%	51%	51%	Negligible
10	457874	225359	1.5	13.75	14.05	14.08	0.03	0%	34%	35%	35%	Negligible
11	458228	224471	1.5	29.01	29.94	30.14	0.20	0%	73%	75%	75%	Negligible
12	458339	224456	1.5	22.57	23.09	23.20	0.11	0%	56%	58%	58%	Negligible
13	458114	224432	1.5	18.87	19.95	20.14	0.19	0%	47%	50%	50%	Negligible
14	457996	224376	1.5	18.69	19.94	20.16	0.22	1%	47%	50%	50%	Negligible
15	458148	224400	1.5	16.66	17.32	17.47	0.15	0%	42%	43%	44%	Negligible
16	458188	224323	1.5	17.76	18.31	18.48	0.17	0%	44%	46%	46%	Negligible
17	458147	224324	1.5	13.37	13.75	13.85	0.10	0%	33%	34%	35%	Negligible
18	458250	223342	1.5	14.43	14.72	14.83	0.11	0%	36%	37%	37%	Negligible
19	458280	222977	1.5	32.93	33.86	34.20	0.34	1%	82%	85%	86%	Negligible
20	458261	222943	1.5	22.73	23.32	23.53	0.21	1%	57%	58%	59%	Negligible
21	458236	222903	1.5	20.53	21.05	21.25	0.20	0%	51%	53%	53%	Negligible

2031 PM_{10}												
Receptor Name	X(m)	Y(m)	Z(m)	2031 Base	2031 DN	2031 DS	DS-DN	% Change	AQAL 2031 Base	AQAL 2031 DN	AQAL 2031 DS	Impact Descriptor
32	458333	224432	2.5	16.49	16.59	16.62	0.02	0%	41%	41%	42%	Negligible
36	458214	222836	2.5	17.20	17.34	17.38	0.05	0%	43%	43%	43%	Negligible
37	458274	222935	2.5	17.43	17.57	17.62	0.05	0%	44%	44%	44%	Negligible
S1	458280.2	225005.9	1.5	15.14	15.24	15.26	0.02	0%	38%	38%	38%	Negligible
S2	458346.4	224955.9	1.5	15.29	15.36	15.38	0.02	0%	38%	38%	38%	Negligible
S3	458430	224901.8	1.5	15.32	15.38	15.41	0.03	0%	38%	38%	39%	Negligible
S4	458545.9	225031.9	1.5	14.80	14.84	14.86	0.02	0%	37%	37%	37%	Negligible
S5	458522.9	224995	1.5	15.10	15.14	15.16	0.02	0%	38%	38%	38%	Negligible
1	458483	224845	1.5	16.13	16.18	16.29	0.11	0%	40%	40%	41%	Negligible
2	458508	224888	1.5	15.79	15.84	15.89	0.05	0%	39%	40%	40%	Negligible
3	458626	225063	1.5	15.61	15.64	15.68	0.03	0%	39%	39%	39%	Negligible
4	458098	224943	1.5	17.02	17.39	17.39	0.01	0%	43%	43%	43%	Negligible
5	458098	224736	1.5	16.62	16.93	16.94	0.01	0%	42%	42%	42%	Negligible
6	458113	224644	1.5	16.91	17.26	17.27	0.01	0%	42%	43%	43%	Negligible
7	458026	225236	1.5	16.86	16.99	17.00	0.01	0%	42%	42%	43%	Negligible
8	457915	225317	1.5	16.12	16.22	16.24	0.01	0%	40%	41%	41%	Negligible
9	457909	225373	1.5	17.80	17.97	17.98	0.02	0%	44%	45%	45%	Negligible
10	457874	225359	1.5	15.90	15.99	16.00	0.01	0%	40%	40%	40%	Negligible
11	458228	224471	1.5	19.34	19.59	19.65	0.06	0%	48%	49%	49%	Negligible
12	458339	224456	1.5	18.60	18.75	18.79	0.03	0%	47%	47%	47%	Negligible
13	458114	224432	1.5	17.29	17.60	17.65	0.06	0%	43%	44%	44%	Negligible
14	457996	224376	1.5	17.48	17.82	17.88	0.06	0%	44%	45%	45%	Negligible
15	458148	224400	1.5	16.71	16.90	16.94	0.04	0%	42%	42%	42%	Negligible
16	458188	224323	1.5	17.24	17.40	17.45	0.05	0%	43%	44%	44%	Negligible
17	458147	224324	1.5	15.89	16.00	16.03	0.03	0%	40%	40%	40%	Negligible
18	458250	223342	1.5	16.59	16.67	16.70	0.03	0%	41%	42%	42%	Negligible
19	458280	222977	1.5	18.64	18.85	18.93	0.08	0%	47%	47%	47%	Negligible
20	458261	222943	1.5	16.86	16.99	17.03	0.05	0%	42%	42%	43%	Negligible
21	458236	222903	1.5	16.76	16.87	16.91	0.04	0%	42%	42%	42%	Negligible

2031 $PM_{2.5}$												
Receptor Name	**X(m)**	**Y(m)**	**Z(m)**	**2031 Base**	**2031 DN**	**2031 DS**	**DS-DN**	**% Change**	**AQAL 2031 Base**	**AQAL 2031 DN**	**AQAL 2031 DS**	**Impact Descriptor**
32	458333	224432	2.5	10.79	10.84	10.86	0.01	0%	90%	90%	90%	Negligible
36	458214	222836	2.5	11.20	11.28	11.30	0.03	0%	93%	94%	94%	Negligible
37	458274	222935	2.5	11.35	11.44	11.47	0.03	0%	95%	95%	96%	Negligible
S1	458280.2	225005.9	1.5	9.44	9.49	9.50	0.01	0%	79%	79%	79%	Negligible
S2	458346.4	224955.9	1.5	10.11	10.16	10.17	0.01	0%	84%	85%	85%	Negligible
S3	458430	224901.8	1.5	10.13	10.16	10.18	0.02	0%	84%	85%	85%	Negligible
S4	458545.9	225031.9	1.5	9.25	9.27	9.28	0.01	0%	77%	77%	77%	Negligible
S5	458522.9	224995	1.5	10.01	10.03	10.04	0.01	0%	83%	84%	84%	Negligible
1	458483	224845	1.5	10.59	10.62	10.68	0.06	0%	88%	89%	89%	Negligible
2	458508	224888	1.5	10.40	10.42	10.45	0.03	0%	87%	87%	87%	Negligible
3	458626	225063	1.5	9.70	9.72	9.74	0.02	0%	81%	81%	81%	Negligible
4	458098	224943	1.5	11.07	11.27	11.28	0.00	0%	92%	94%	94%	Negligible
5	458098	224736	1.5	10.86	11.04	11.05	0.01	0%	91%	92%	92%	Negligible
6	458113	224644	1.5	11.02	11.22	11.23	0.01	0%	92%	93%	94%	Negligible
7	458026	225236	1.5	10.38	10.46	10.47	0.01	0%	87%	87%	87%	Negligible
8	457915	225317	1.5	9.86	9.91	9.92	0.01	0%	82%	83%	83%	Negligible
9	457909	225373	1.5	10.78	10.87	10.88	0.01	0%	90%	91%	91%	Negligible
10	457874	225359	1.5	9.73	9.78	9.78	0.01	0%	81%	81%	82%	Negligible
11	458228	224471	1.5	**12.42**	**12.56**	**12.59**	0.03	0%	103%	105%	105%	Negligible
12	458339	224456	1.5	11.96	**12.04**	**12.06**	0.02	0%	100%	100%	101%	Negligible
13	458114	224432	1.5	11.24	11.41	11.44	0.03	0%	94%	95%	95%	Negligible
14	457996	224376	1.5	10.76	10.95	10.99	0.03	0%	90%	91%	92%	Negligible
15	458148	224400	1.5	10.91	11.01	11.04	0.02	0%	91%	92%	92%	Negligible
16	458188	224323	1.5	11.20	11.29	11.31	0.03	0%	93%	94%	94%	Negligible
17	458147	224324	1.5	10.45	10.51	10.53	0.02	0%	87%	88%	88%	Negligible
18	458250	223342	1.5	11.08	11.13	11.15	0.02	0%	92%	93%	93%	Negligible
19	458280	222977	1.5	**12.06**	**12.18**	**12.23**	0.04	0%	101%	102%	102%	Negligible
20	458261	222943	1.5	11.03	11.10	11.12	0.03	0%	92%	92%	93%	Negligible
21	458236	222903	1.5	10.95	11.01	11.04	0.02	0%	91%	92%	92%	Negligible

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APPENDICES

APPENDIX H

Mitigation for all sites: Communications

Mitigation measure	Low Risk	Medium Risk	High Risk
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H
3. Display the head or regional office contact information	H	H	H

Mitigation for all sites: Dust Management

Mitigation measure	Low Risk	Medium Risk	High Risk
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.	D	H	H
Site Management			
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H	H	H
6. Make the complaints log available to the local authority when asked.	H	H	H
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H	H	H
8. Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	N	N	H
Monitoring			
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	D	D	H
10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked	H	H	H
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H
12. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H
Preparing and maintaining the site			
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	D	H	H
16. Avoid site runoff of water or mud.	H	H	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H

Mitigation measure	Low Risk	Medium Risk	High Risk
18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	D	H	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H
Operating vehicle/machinery and sustainable travel			
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	H	H	H
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	D	D	H
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	N	D	H
Operations			
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H	H	H
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H
28. Use enclosed chutes and conveyors and covered skips.	H	H	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H
30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D	H	H
Waste management			
31. Avoid bonfires and burning of waste materials.	H	H	H

Measures specific to demolition

Mitigation measure	Low Risk	Medium Risk	High Risk
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	D	D	H
33. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H	H	H
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H
35. Bag and remove any biological debris or damp down such material before demolition.	H	H	H

Measures specific to earthworks

Mitigation measure	Low Risk	Medium Risk	High Risk
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable..	N	D	H
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	N	D	H
38. Only remove the cover in small areas during work and not all at once	N	D	H

Measures specific to construction

Mitigation measure	Low Risk	Medium Risk	High Risk
39. Avoid scabbling (roughening of concrete surfaces) if possible	D	D	H
40. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D	H	H
41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	N	D	H
42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D

Measures specific to trackout

Mitigation measure	Low Risk	Medium Risk	High Risk
43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	D	H	H
44. Avoid dry sweeping of large areas.	D	H	H
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H
51. Access gates to be located at least 10m from receptors where possible.	N	H	H

Key to Tables:

H	Highly recommended
D	Desirable
N	Not required

- CIVIL ENGINEERING
- TRANSPORT
- FLOOD RISK & DRAINAGE
- STRUCTURES
- GEO-ENVIRONMENTAL
- ACOUSTIC AIR
- UTILITIES
- GEOMATICS
- LIGHTING
- EXPERT WITNESS

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