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GLADMAN DEVELOPMENTS LIMITED

PEAR TREE LANE, EUXTON

AIR QUALITY ASSESSMENT

MAY 2019

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GLADMAN DEVELOPMENTS LIMITED

PEAR TREE LANE, EUXTON

AIR QUALITY ASSESSMENT

MAY 2019

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APPENDICES

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EXECUTIVE SUMMARY

An air quality assessment has been undertaken to accompany a planning application for a proposed residential development at Pear Tree Lane, Euxton, Chorley. It is understood that the proposals are for a maximum of 180 dwellings and associated infrastructure.

Annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations have been modelled at twenty-five existing receptor locations, using the most recent Emission Factor Toolkit available from DEFRA (v 9.0). The air quality assessment has applied 2018 background pollution concentrations and vehicle emission factors to the 2025 opening/future year to provide a robust conservative approach. Predicted annual mean concentrations have been compared to the relevant air quality objectives and target level.

For the construction phase, the risk of dust soiling effects is classed as high for earthworks and construction and medium for trackout; the risk of human health effects is classed as low for earthworks, construction and trackout. Mitigation measures are proposed to further reduce any potential impacts based on best practice guidance.

For the operational phase, the assessment concludes that the development will result in concentrations of NO_2, PM_{10} and $PM_{2.5}$ remaining below the air quality objectives/target values, both without and with the development for the proposed 2025 opening/future year. The impact of the development is predicted to be negligible at all twenty-five existing sensitive receptors that were assessed. Air quality effects are therefore considered to be ‘not significant’.

The assessment demonstrates that the Proposed Development will not lead to an unacceptable risk from air pollution, or to any breach in national objectives. Therefore, there are no material reasons in relation to air quality why the proposed scheme should not proceed, subject to appropriate planning conditions.

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1 INTRODUCTION

1.1 Background

1.1.1 Wardell Armstrong LLP (WA) has been commissioned by Gladman Developments Limited to undertake an air quality assessment to accompany an outline planning application for a proposed residential development at Pear Tree Lane, Euxton, Chorley.

1.1.2 The proposed development site is an irregular-shaped plot of land located to the east of Euxton. The northern boundary of the site is bordered by School Lane, with open fields and Euxton Lane beyond. To the north east there are a small number of existing residential dwellings off School Lane and Pear Tree Lane. The east and south of the site is bordered by open agricultural land, with some further residential dwellings to the south east. The west of the site is adjacent to a larger residential estate with the Euxton Balshaw to Leyland railway line further beyond. The proposed development site is currently a series of large open fields.

1.1.3 It is understood the proposed residential development comprises approximately 180 residential dwellings and associated infrastructure.

1.1.4 This report details the results of the air quality assessment undertaken to accompany an outline planning application for the proposed development. The report discusses the potential dust and fine particulate matter impacts associated with the construction phase, and an assessment of the potential air quality impacts of the additional road traffic generated by the proposed development. Air pollutant concentrations are considered at existing sensitive receptor locations in the vicinity of the proposed development, and also at a proposed receptor location within the development site itself.

2 LEGISLATION AND POLICY CONTEXT

2.1 Relevant Air Quality Legislation and Guidance

2.1.1 The air quality assessment has been undertaken in accordance with the following legislation and guidance:

- EU Ambient Air Quality Directive 2008/50/EC (i.e. the CAFE Directive);
- The Environment Act 1995;
- Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007;
- The Air Quality Standards Regulations 2010;
- Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(16), February 2018;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework, February 2019; and
- Department for Communities and Local Government, Planning Practice Guidance: Air Quality, March 2014.

2.1.2 Further details of these documents are included in **Appendix A**.

2.2 Assessment Criteria

2.2.1 The relevant air quality objectives and limit values for this assessment are included within Table 1.

Table 1: Air Quality Objectives and Limit Values Relevant to the Assessment*

Pollutant	Objective/Limit Value	Averaging Period	Obligation
Nitrogen Dioxide (NO_2)	200µg/m^3, not to be exceeded more than 18 times a year	1-hour mean	All local authorities
	40µg/m^3	Annual mean	All local authorities
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	England, Wales and Northern Ireland
	40µg/m^3	Annual mean	England, Wales and Northern Ireland
Particulate Matter ($PM_{2.5}$)	Limit Value of 25µg/m^3	Annual mean	England, Wales and Northern Ireland

**In accordance with the Air Quality Standards Regulations 2010*

2.2.2 Further details of where these objectives and limit values apply are detailed in **Appendix A**.

3 ASSESSMENT METHODOLOGY

3.1 Consultation and Scope of Assessment

3.1.1 The assessment methodology was discussed and agreed with Ms Lesley Miller, Regulatory Services Manager at Chorley Council (CC) via email correspondence, on 18th February 2019.

3.1.2 A summary of the consultation undertaken is provided in Table 2.

Table 2: Summary of Consultation

Assessment Stage	Proposed Method	Response
Construction phase assessment to consider dust and fine particulate matter (PM_{10})	Qualitative assessment in accordance with Institute of Air Quality Management (IAQM) guidance	No objection to method
Operational phase assessment to consider nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$)	Detailed assessment using the ADMS-Roads atmospheric dispersion model, in accordance with Environmental Protection UK (EPUK)/IAQM guidance, and with all predicted concentrations compared to air quality objectives/limit values	No objection to method
	2017 meteorological data from Rostherne No.2 recording station	No objection to method.
	Background NO_2, PM_{10} and $PM_{2.5}$ concentrations from 2015-based DEFRA default maps	No objection to method.
	Assessment undertaken using EFT8.0.1 emission factors, as well as a sensitivity analysis.	No objection to method.
	Model verification will be undertaken using two council owned diffusion tubes in the vicinity of the proposed development (A49 Wigan Road South Balshaw Lane (CH09) and A49 Wigan Road South Euxton Lane (CH11).	No objection to method.

3.1.3 Further consultation was undertaken with Ms Miller on 23rd April 2019, to ascertain if the 2018 bias adjusted diffusion tube data was available for the two diffusion tubes to be used within the assessment. The 2018 data for the diffusion tubes were provided via email from Ms Miller on the 26th April 2019 and so this data has been used in the assessment instead of the previously agreed 2017 data.

3.1.4 As 2018 diffusion tube data has been incorporated in the assessment, 2018 met data has been obtained from the Rostherne No.2 recording station and utilised in the model.

3.1.5 DEFRA released EFT v9.0 and the 2017-based background maps in May 2019 and therefore these have replaced the previous EFT 8.0.1 and 2015-based maps proposed for use in the assessment.

3.2 Construction Phase Assessment

3.2.1 To assess the impacts associated with dust and fine particulate matter releases during the construction phase of the development, an assessment has been undertaken in accordance with guidance from the Institute of Air Quality Management (IAQM)[1]. Further details of the construction assessment methodology are provided in **Appendix B**.

3.2.2 The closest sensitive human receptors to where construction phase activities will take place are residential in nature and are detailed in Table 3.

Table 3: Existing Sensitive Receptors Considered in the Construction Phase Assessment

Receptor	Direction from the Site	Approximate Distance from the Site Boundary (m)
Existing residential property off Euxton Lane	North	Approximately 175m at closest point
Existing residential properties off School Lane	East	Immediately adjacent at closest point
Existing residential properties off Pear Tree Lane	South	Immediately adjacent at closest point
Existing residential properties off School Lane	West	Immediately adjacent at closest point

3.2.3 There are no ecological receptors, or potentially dust sensitive statutory designated habitat sites, located within 50m of the site and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Therefore, ecological effects do not need to be considered within this assessment.

3.2.4 The criteria used to assess the construction impact of the proposed development, and the associated significance of effects at existing sensitive receptors, are included in **Appendix B**.

[1] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction, June 2016

3.3 Operational Phase Assessment

3.3.1 The air dispersion model ADMS-Roads (CERC, Version 4.1) has been used to assess the impacts associated with road traffic emissions during the operational phase assessment. The impacts have been assessed in accordance with guidance from Environmental Protection UK (EPUK) and the IAQM[2]. Further details of the modelling and assessment methodology are provided in **Appendix C**.

3.3.2 NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted at existing and proposed sensitive receptors as these are the pollutants considered most likely to exceed the objectives and limit values.

3.3.3 Following the release of an update to the Emission Factor Toolkit (EFT) in May 2019, EFT version 9.0 has been utilised in the assessment[3].

3.3.4 Air dispersion modelling has been carried out to estimate pollutant concentrations, due to road traffic emissions, for three assessment scenarios as follows:

- **Scenario 1:** 2018 Base Year, the most recent year for which traffic flow information and meteorological data is available;
- **Scenario 2:** 2025 Opening/Future Year, without the proposed development in place; and
- **Scenario 3:** 2025 Opening/Future Year, with the proposed development in place.

Existing Sensitive Receptors

3.3.5 A number of representative existing sensitive receptors (identified as ESR 1 to ESR 25) have been selected for consideration in the air quality assessment. These have been chosen based on their sensitivity and their proximity to roads which will be affected by development generated traffic.

3.3.6 Details of the receptors considered are provided in Table 4, and their locations are shown on drawing GM10466-01.

[2] Moorcroft and Barrowcliffe et al, Land-Use Planning and Development Control: Planning for Air Quality (v1.2), January 2017
[3] Defra Local Air Quality Management webpages (https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html)

Table 4: Existing Sensitive Receptors Considered in Operational Phase Assessment				
Receptor	Address	Grid Reference		Receptor Type
		Easting	Northing	
ESR 1	School Lane, Euxton	355716	419236	Residential
ESR 2	School Lane, Euxton	355740	419269	Residential
ESR 3	School Lane, Euxton	355998	419464	Residential
ESR 4	Pear Tree Lane, Euxton	356013	419447	Residential
ESR 5	Pear Tree Lane, Euxton	356030	419618	Residential
ESR 6	School Lane, Euxton	355547	419118	Residential
ESR 7	A49 Wigan Road, Euxton	355479	419156	Residential
ESR 8	A49 Wigan Road, Euxton	355452	419314	Residential
ESR 9	A49 Wigan Road, Euxton	355429	419503	Residential
ESR 10	Bay Horse Pub, A60 Wigan Road, Euxton	355426	419532	First Floor Apartment
ESR 11	Runshaw Lane, Euxton	355394	419550	Residential
ESR 12	Runshaw Lane, Euxton	355339	419529	Residential
ESR 13	Euxton Lane, Euxton	355485	419543	Residential
ESR 14	Pear Tree Lane, Euxton	356009	419672	Residential
ESR 15	Runshaw College, Euxton Lane, Euxton	356363	419752	School
ESR 16	Stanfield House Farm, Euxton Lane, Euxton	356599	419621	Residential
ESR 17	Mimosa Close, Euxton	357283	419388	Residential
ESR 18	Mimosa Close, Euxton	357257	419355	Residential
ESR 19	Chancery Fields, Euxton	357116	419222	Residential
ESR 20	Chorley and South Ribble Hospital, Euxton	358123	419110	Residential
ESR 21	Hazel Grove, Euxton	358375	419261	Residential
ESR 22	Balshaw Lane, Euxton	355835	418453	Residential
ESR 23	A49 Wigan Road, Euxton	355498	418506	Residential

Table 4: Existing Sensitive Receptors Considered in Operational Phase Assessment				
Receptor	Address	Grid Reference		Receptor Type
		Easting	Northing	
ESR 24	Euxton Mills Pub, Dawbers Lane, Euxton	355529	418243	First Floor Apartment
ESR 25	A49 Wigan Road, Euxton	355537	418206	Residential

3.3.7 The criteria used to assess the operational impact of the proposed development, and the associated significance of effects at existing sensitive receptors, are included in **Appendix C**.

Proposed Sensitive Receptors

3.3.8 A number of proposed sensitive receptors (referred to as PR 1 to PR 3) have been selected within the development site boundary. These receptors are considered to be representative of the proposed residential areas which will be closest to the main existing source(s) of pollution. In this case, the main source is considered to be vehicle emissions from School Lane, Pear Tree Lane and the Site Access road.

3.3.9 Pollutant concentrations at the proposed receptors have been predicted for scenario 3 only (as detailed in paragraph 3.3.3). It is only necessary to consider the 'with development' scenarios for the proposed receptors as they will not experience any 'without development' conditions. It is not therefore necessary to consider the changes in pollutant concentrations at the proposed receptors.

3.3.10 Details of the proposed sensitive receptors are provided in Table 5, and their locations are shown on drawing GM10466-01.

Table 5: Proposed Sensitive Receptors Considered in the Operational Phase Assessment			
Receptor Point	Location	Grid Reference	
		Easting	Northing
PR 1	Location considered to be representative of a proposed residential property in the west of the site closest to School Lane and the proposed Site Access Road.	355737	419523
PR 2	Location considered to be representative of a proposed residential property in the centre of the site closest to the proposed Site Access Road	355846	419362
PR 3	Location considered to be representative of a proposed residential property in the north of the site closest to School Lane and the proposed Site Access Road.	355929	419445

3.3.11 Pollutant concentrations associated with road traffic emissions are expected to be highest at lower floor levels, and therefore, each of the proposed receptors (i.e. PR 1 to PR 3) have been modelled at ground level (i.e. 1.5m).

3.3.12 The predicted concentrations at the proposed receptors have been assessed against the air quality objectives and limit values detailed in Table 1.

3.4 Model Validation, Verification and Adjustment

3.4.1 LAQM.TG(16) recognises that model validation generally refers to detailed studies that have been carried out by the model supplier or a regulatory agency. The ADMS-Roads model has been validated by the supplier CERC.

3.4.2 Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads model is achieved by modelling concentration(s) at existing monitoring location(s) in the vicinity of the proposed development and comparing the modelled concentration(s) with the measured concentration(s).

3.4.3 Further details of the model verification can be found within **Appendix C**.

3.5 Limitations and Uncertainties

3.5.1 At present, there is a degree of uncertainty associated with the prediction of future NO_2 concentrations, and consequently the assessment of impacts relating to development generated road traffic emissions.

3.5.2 Air quality assessments make use of official sources of information (i.e. vehicle emission factors and background concentrations) which are increasingly considered to be overly optimistic. Monitoring data collected by the UK Government and local authorities shows that annual mean NO_2 concentrations have remained higher than previously expected (especially in roadside locations). This is widely thought to be due to the lower than expected decline in NO_x emissions from diesel vehicles (even as new Euro standards have been introduced), coupled with an overall increase in the number of diesel vehicles on the road.

3.5.3 The vehicle emission factors used in this assessment are from Defra's Emission Factor Toolkit (EFT v9.0)[4], which is the most up-to-date version available. Although this is considered to be more realistic than earlier versions, uncertainty remains.

[4] Defra Local Air Quality Management webpages (https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html)

3.5.4 A position statement has recently been produced by the IAQM which deals specifically with the use of EFT v9.0 and the consideration of uncertainties in predicting future air quality[5]. The statement concludes that the approaches for dealing with this uncertainty should be decided on a case-by-case basis, but may include use of a sensitivity test (in which it is assumed that NO_x emissions will not reduce as quickly as within the EFT). The statement also highlights the need for careful consideration of the results of any sensitivity test, particularly with regard to assessing impacts and the significance of effects. A precautionary approach is recommended.

3.5.5 This assessment takes into account the uncertainties associated with predicting future air quality by applying 2018 background pollution concentrations and vehicle emission factors to the 2025 opening year/future year, to provide a robust conservative approach. Further details of the methodology are provided in **Appendix C** and the results are detailed in section 5 of this report.

3.6 Euxton Balshaw to Leyland Railway Line

3.6.1 The Euxton Balshaw to Leyland railway line is located approximately 150m to the west of the proposed development site.

3.6.2 The Defra local air quality management technical guidance document LAQM.TG(16) contains details of railway lines which have a high volume of diesel traffic and may therefore require more detailed consideration of emissions.

3.6.3 This section of railway line is included (Crewe to Gretna Railway Line), however these lines need only be considered where the background annual mean NO_2 concentration is above 25 $\mu g/m^3$.

3.6.4 As the annual mean background NO_2 concentration at the site is 12.65$\mu g/m^3$, an assessment of railway emissions will not be required at this stage. Therefore, the Euxton Balshaw to Leyland railway line is not considered further within this assessment.

[5] Institute of Air Quality Management, Dealing with Uncertainty in Vehicle NO_x Emissions within Air Quality Assessments v1.1, July 2018

4 BASELINE SITUATION

4.1 Chorley Council (CC) Local Air Quality Management

4.1.1 The proposed development site is located within the administrative area of CC which is responsible for the management of local air quality.

4.1.2 There are no declared Air Quality Management Area (AQMA) in CC's area. Therefore, the proposed development does not lie within a known area of poor air quality.

4.1.3 A review of the 2018 Air Quality Annual Status Report (ASR) for CC (the latest report available) indicates that CC undertook non-automatic sampling at twenty monitoring locations throughout 2017. These include a mix of roadside and kerbside locations.

4.1.4 Two of these monitoring locations are located in close proximity to the proposed development site. The A49 Wigan Road South Balshaw Lane (Ref: CH09) and A49 Wigan Road South Euxton Lane (Ref: CH11) diffusion tubes recorded NO_2 concentrations of 30.3 and 28.23µg/m^3 respectively, in 2017.

4.1.5 Despite the 2019 ASR not yet being published, the EHO at CC has provided the 2018 diffusion tube data for both CH09 and CH11 for use within the assessment. During 2018, these diffusion tubes recorded NO_2 concentrations of 28.55 and 26.62µg/m^3 respectively, indicating that air quality has slightly improved during 2018 when compared to 2017.

4.2 Background Air Pollutant Concentrations

4.2.1 The air quality assessment needs to take into account background concentrations upon which the local, traffic derived pollution is superimposed.

4.2.2 As there are currently no representative NO_2, PM_{10} or $PM_{2.5}$ monitoring locations in the vicinity of the proposed development site, background concentrations for these pollutants have been obtained from the 2015-based Defra default concentration maps, for the appropriate grid squares[6].

4.2.3 The background pollutant concentrations used in this assessment are detailed in Table 6.

[6] Accessed through the Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html)

Table 6: Background Pollutant Concentrations Used in the Air Quality Assessment

Receptors	2018 Annual Mean Concentrations (µg/m^3)			
	Oxides of Nitrogen (NO_x)	Nitrogen Dioxide (NO_2)	Particulates (PM_{10})	Particulates ($PM_{2.5}$)
ESR 1-3 & 6-13 & PR 1-3 (355500, 419500)	17.00	12.45	10.59	6.96
ESR 4-5 & 14-16 (356500, 419500)	15.78	11.60	11.52	7.11
ESR 17-19 (357500, 419500)	16.08	11.81	10.56	6.79
ESR 20 & 21 (358500, 419500)	23.56	16.61	11.90	7.59
ESR 22 – 25 (355500, 418500)	17.75	12.96	10.80	7.03

4.3 Modelled Baseline Concentrations at Existing Sensitive Receptors

4.3.1 Current evidence suggests that NO_2 background concentrations and emissions are not decreasing in accordance with expected reductions. The air quality assessment has therefore applied 2018 background pollution concentrations and vehicle emission factor to the 2025 opening/future year to provide a robust conservative approach.

4.3.2 The baseline assessment (i.e. scenarios 1 and 2) has been carried out for the existing sensitive receptors considered. The adjusted NO_2 and unadjusted PM_{10} and $PM_{2.5}$ concentrations are detailed in Table 7.

Table 7: Predicted Adjusted NO_2 and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 1 and 2

Receptor	Calculated Annual Mean Concentrations (µg/m^3)					
	Scenario 1: 2018 Base Year			Scenario 2: 2025 Opening/Future Year, Without Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
ESR 1	14.84	10.81	7.09	15.16	10.84	7.11
ESR 2	14.53	10.78	7.07	14.81	10.81	7.09
ESR 3	15.55	10.85	7.12	15.98	10.89	7.14
ESR 4	14.74	11.79	7.27	15.10	11.82	7.29
ESR 5	15.74	11.89	7.33	16.32	11.94	7.36
ESR 6	16.64	10.94	7.17	17.05	10.98	7.19

Table 7: Predicted Adjusted NO_2 and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 1 and 2

Receptor	Calculated Annual Mean Concentrations (µg/m³)					
	Scenario 1: 2018 Base Year			Scenario 2: 2025 Opening/Future Year, Without Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
ESR 7	26.91	11.78	7.67	28.24	11.90	7.74
ESR 8	24.96	11.81	7.68	26.59	11.98	7.77
ESR 9	29.09	11.90	7.75	31.34	12.09	7.86
ESR 10	25.02	11.57	7.55	26.84	11.72	7.64
ESR 11	26.25	11.67	7.61	28.16	11.83	7.71
ESR 12	22.50	11.50	7.50	23.89	11.63	7.57
ESR 13	20.44	11.28	7.37	21.84	11.40	7.44
ESR 14	17.65	12.08	7.44	18.75	12.18	7.50
ESR 15	16.00	11.92	7.35	17.03	12.01	7.40
ESR 16	19.00	12.14	7.48	20.50	12.27	7.56
ESR 17	24.88	11.59	7.41	26.66	11.74	7.50
ESR 18	22.81	11.40	7.30	24.33	11.52	7.37
ESR 19	21.86	11.29	7.23	23.13	11.38	7.29
ESR 20	33.27	13.25	8.41	35.37	13.44	8.52
ESR 21	35.81	13.39	8.50	37.48	13.54	8.58
ESR 22	21.21	11.58	7.49	21.91	11.65	7.53
ESR 23	27.54	11.89	7.69	28.73	11.98	7.75
ESR 24	22.23	11.48	7.44	23.00	11.54	7.48
ESR 25	25.17	11.74	7.60	26.18	11.82	7.64

NO_2 concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO_2 calculator[7] in accordance with LAQM.TG(16)

[7] Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html)

4.3.3 The results show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant objectives and limit values.

5 IMPACT ASSESSMENT

5.1 Construction Phase Assessment

Step 2 – Impact Assessment

5.1.1 In accordance with the IAQM guidance, the main activities to be considered during the construction phase of the proposed development are earthworks, construction and trackout.

5.1.2 There are no demolition activities associated with the proposed development and therefore it is not considered further in this assessment.

5.1.3 Earthworks covers the processes of soil-stripping, ground-levelling, excavation and landscaping. Construction activities will focus on the proposed buildings, access roads car parking areas. Trackout is defined as the transport of dust and dirt by vehicles travelling from a construction site on to the public road network. This may occur through the spillage of dusty materials onto road surfaces or through the transportation of dirt by vehicles that have travelled over muddy ground on the site. This dust and dirt can then be deposited and re-suspended by other vehicles.

Step 2A

5.1.4 Step 2A of the assessment defines the potential dust emission magnitude from earthworks, construction and trackout in the absence of site specific mitigation.

5.1.5 Examples of the criteria for the dust emission classes are detailed in **Appendix B**. The results of this step are detailed in Table 8.

Step 2B

5.1.6 Step 2B of the construction phase dust assessment defines the sensitivity of the area, taking into account the significance criteria detailed in **Appendix B**, for earthworks, construction and trackout. The sensitivity of the area to each activity is assessed for potential dust soiling, human health effects and ecological effects.

5.1.7 For earthworks and construction, there are currently between 10 and 100 receptors (all residential) within 20m of where these activities may take place, which is assumed to be the site boundary for the purposes of this assessment.

5.1.8 The routing of construction vehicles is unknown at this stage. Therefore, for the purposes of this assessment, worst case routing scenarios have been assumed for assessment of potential trackout impacts at nearby receptors.

5.1.9 As a result, for trackout, there are between 10 and 100 receptors (mainly residential) within 20m of where trackout may occur for a distance of up to 500m from the site entrance (assuming construction vehicles travel west along Euxton Road after leaving the proposed development site).

Step 2C

5.1.10 Step 2C of the construction phase dust assessment defines the risk of impacts from each activity, by combining the dust emission magnitude with the sensitivity of the surrounding area.

5.1.11 The risk of dust impacts from each activity, with no mitigation in place, has been assessed in accordance with the criteria detailed in **Appendix B**. The results of this step are detailed in Table 8.

Summary of Step 2

5.1.12 Table 8 details the results of Step 2 of the construction phase assessment for human receptors.

Table 8: Construction Phase Dust Assessment for Human Receptors

	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Step 2A				
Dust Emission Magnitude	N/A	Large[a]	Large[b]	Medium[c]
Step 2B				
Sensitivity of Closest Receptors	N/A	High	High	High
Sensitivity of Area to Dust Soiling Effects	N/A	High	High	High
Sensitivity of Area to Human Health Effects	N/A	Low[d]	Low[d]	Low[d]
Step 2C				
Dust Risk: Dust Soiling	N/A	High Risk	High Risk	Medium Risk
Dust Risk: Human Health	N/A	Low Risk	Low Risk	Low Risk

a. Total site area estimated to be more than 10,000m²
b. Total building volume estimated to be over 100,000m³, with potentially dusty construction materials
c. Number of construction phase vehicles estimated to be between 10 and 50 movements per day
d. Background annual mean PM_{10} concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid square for 2018

Step 3 – Mitigation

5.1.13 During the construction phase, the implementation of effective mitigation measures will substantially reduce the potential for nuisance dust and particulate matter to be generated.

5.1.14 Step 2C of the assessment has identified that the risk of dust soiling and human health effects is not negligible for all the activities and therefore site-specific mitigation will need to be implemented to ensure dust effects from these activities will be not significant.

Recommendations for Site-Specific Mitigation

5.1.15 Specific mitigation relating to dust control may be in the form of construction best practices or could include a dust management plan. Recommendations for mitigation within the IAQM guidance include:

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Protection of surfaces and exposed material from winds until disturbed areas are sealed and stable;
- Dampening down of exposed stored materials, which will be stored as far from sensitive receptors as possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Avoidance of activities that generate large amounts of dust during windy conditions;
- 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;
- Avoid dry sweeping of large areas;
- 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;
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport;

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Minimisation of vehicle movements and limitation of vehicle speeds – the slower the vehicle speeds, the lower the dust generation;
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the site size and layout permits; and
- Access gates to be located at least 10m from receptors, where possible.

5.1.16 All dust and air quality complaints should be recorded, and appropriate measures be taken to identify causes and reduce emissions in a timely manner. Exceptional incidents which cause dust and/or emissions, and the action taken to resolve the situation, should be recorded in a log book and made available to CDC on request.

5.1.17 It is recognised that the final design solutions will be developed with the input of the Contractor to maximise construction efficiencies, to use modern construction techniques and sustainable materials and to incorporate the particular skills and experience offered by the appointed contractor.

Step 4 – Residual Effects

5.1.18 Step 4 of the construction phase dust assessment has been undertaken to determine the significance of the dust effects arising from earthworks, construction and trackout associated with the proposed development.

5.1.19 The implementation of effective mitigation measures during the construction phase, such as those detailed in Step 3, will substantially reduce the potential for nuisance dust and particulate matter to be generated and any residual impact should be **not significant**.

5.2 Operational Phase Assessment

Existing Sensitive Receptor – Human Receptors

5.2.1 Current evidence suggests that NO_2 background concentrations and emissions are not decreasing in accordance with expected reductions. The air quality assessment has therefore applied 2018 background pollution concentrations and vehicle emission factor to the 2025 opening/future year to provide a robust conservative approach.

5.2.2 The impact assessment has been carried out for the representative existing sensitive receptors considered (i.e. ESR 1 to ESR 25).

5.2.3 Table 9 details the predicted NO_2 concentrations for the 2025 Opening/Future Year, for both the 'Without Development' and 'With Development' scenarios. The impact has been assessed in accordance with the descriptors included in **Appendix C**.

Table 9: Predicted Adjusted NO_2 Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean NO_2 Concentrations (µg/m³)[a]				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[b]
		Concentration	Percentage in Relation to AQAL		
ESR 1	15.16	15.62	<75%	1%	**Negligible**
ESR 2	14.81	15.03	<75%	1%	**Negligible**
ESR 3	15.98	16.72	<75%	2-5%	**Negligible**
ESR 4	15.10	15.83	<75%	2-5%	**Negligible**
ESR 5	16.32	17.04	<75%	2-5%	**Negligible**
ESR 6	17.05	17.50	<75%	1%	**Negligible**
ESR 7	28.24	28.55	<75%	1%	**Negligible**
ESR 8	26.59	26.82	<75%	1%	**Negligible**
ESR 9	31.34	31.62	<76-94%	1%	**Negligible**
ESR 10	26.84	27.06	<75%	1%	**Negligible**
ESR 11	28.16	28.37	<75%	1%	**Negligible**
ESR 12	23.89	23.94	<75%	<0.5%	**Negligible**
ESR 13	21.84	22.00	<75%	<0.5%	**Negligible**
ESR 14	18.75	19.23	<75%	1%	**Negligible**
ESR 15	17.03	17.11	<75%	<0.5%	**Negligible**
ESR 16	20.50	20.65	<75%	<0.5%	**Negligible**
ESR 17	26.66	26.88	<75%	1%	**Negligible**
ESR 18	24.33	24.44	<75%	<0.5%	**Negligible**
ESR 19	23.13	23.14	<75%	<0.5%	**Negligible**
ESR 20	35.37	35.61	<76-94%	1%	**Negligible**

Table 9: Predicted Adjusted NO_2 Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean NO_2 Concentrations (µg/m³)[a]				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[b]
		Concentration	Percentage in Relation to AQAL		
ESR 21	37.48	37.62	<76-94%	<0.5%	**Negligible**
ESR 22	21.91	21.97	<75%	<0.5%	**Negligible**
ESR 23	28.73	28.94	<75%	1%	**Negligible**
ESR 24	23.00	23.08	<75%	<0.5%	**Negligible**
ESR 25	26.18	26.31	<75%	<0.5%	**Negligible**

a. NO_2 concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO_2 calculator, in accordance with LAQM.TG(16)
b. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible

5.2.4 Table 10 details the PM_{10} concentrations for the 2025 Opening/Future Year, for both the 'Without Development' and 'With Development' scenarios. The impact has been assessed in accordance with the descriptors included in **Appendix C**.

Table 10: Predicted Unadjusted PM_{10} Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean PM_{10} Concentrations (µg/m³)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		
ESR 1	10.84	10.88	<75%	<0.5%	**Negligible**
ESR 2	10.81	10.83	<75%	<0.5%	**Negligible**
ESR 3	10.89	10.95	<75%	<0.5%	**Negligible**
ESR 4	11.82	11.89	<75%	<0.5%	**Negligible**
ESR 5	11.94	12.00	<75%	<0.5%	**Negligible**
ESR 6	10.98	11.01	<75%	<0.5%	**Negligible**
ESR 7	11.90	11.93	<75%	<0.5%	**Negligible**
ESR 8	11.98	12.00	<75%	<0.5%	**Negligible**

Table 10: Predicted Unadjusted PM_{10} Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean PM_{10} Concentrations (µg/m³)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		
ESR 9	12.09	12.11	<75%	<0.5%	**Negligible**
ESR 10	11.72	11.74	<75%	<0.5%	**Negligible**
ESR 11	11.83	11.84	<75%	<0.5%	**Negligible**
ESR 12	11.63	11.63	<75%	<0.5%	**Negligible**
ESR 13	11.40	11.42	<75%	<0.5%	**Negligible**
ESR 14	12.18	12.22	<75%	<0.5%	**Negligible**
ESR 15	12.01	12.02	<75%	<0.5%	**Negligible**
ESR 16	12.27	12.28	<75%	<0.5%	**Negligible**
ESR 17	11.74	11.76	<75%	<0.5%	**Negligible**
ESR 18	11.52	11.53	<75%	<0.5%	**Negligible**
ESR 19	11.38	11.38	<75%	<0.5%	**Negligible**
ESR 20	13.44	13.47	<75%	<0.5%	**Negligible**
ESR 21	13.54	13.55	<75%	<0.5%	**Negligible**
ESR 22	11.65	11.66	<75%	<0.5%	**Negligible**
ESR 23	11.98	12.00	<75%	<0.5%	**Negligible**
ESR 24	11.54	11.55	<75%	<0.5%	**Negligible**
ESR 25	11.82	11.83	<75%	<0.5%	**Negligible**

a. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible

5.2.5 Table 11 details the $PM_{2.5}$ concentrations for the 2025 Opening/Future Year, for both the 'Without Development' and 'With Development' scenarios. The impact has been assessed in accordance with the descriptors included in **Appendix C**.

Table 11: Predicted Unadjusted $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		
ESR 1	7.11	7.13	<75%	<0.5%	**Negligible**
ESR 2	7.09	7.10	<75%	<0.5%	**Negligible**
ESR 3	7.14	7.17	<75%	<0.5%	**Negligible**
ESR 4	7.29	7.33	<75%	<0.5%	**Negligible**
ESR 5	7.36	7.40	<75%	<0.5%	**Negligible**
ESR 6	7.19	7.21	<75%	<0.5%	**Negligible**
ESR 7	7.74	7.76	<75%	<0.5%	**Negligible**
ESR 8	7.77	7.79	<75%	<0.5%	**Negligible**
ESR 9	7.86	7.88	<75%	<0.5%	**Negligible**
ESR 10	7.64	7.65	<75%	<0.5%	**Negligible**
ESR 11	7.71	7.72	<75%	<0.5%	**Negligible**
ESR 12	7.57	7.58	<75%	<0.5%	**Negligible**
ESR 13	7.44	7.45	<75%	<0.5%	**Negligible**
ESR 14	7.50	7.53	<75%	<0.5%	**Negligible**
ESR 15	7.40	7.41	<75%	<0.5%	**Negligible**
ESR 16	7.56	7.57	<75%	<0.5%	**Negligible**
ESR 17	7.50	7.51	<75%	<0.5%	**Negligible**
ESR 18	7.37	7.38	<75%	<0.5%	**Negligible**
ESR 19	7.29	7.29	<75%	<0.5%	**Negligible**
ESR 20	8.52	8.53	<75%	<0.5%	**Negligible**
ESR 21	8.58	8.59	<75%	<0.5%	**Negligible**
ESR 22	7.53	7.53	<75%	<0.5%	**Negligible**
ESR 23	7.75	7.76	<75%	<0.5%	**Negligible**
ESR 24	7.48	7.48	<75%	<0.5%	**Negligible**
ESR 25	7.64	7.65	<75%	<0.5%	**Negligible**

Table 11: Predicted Unadjusted $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3

Receptor	Calculated Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		

a. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible

5.2.6 The results of the assessment show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, in all scenarios considered, are below the relevant objectives and limit values.

Proposed Sensitive Human Receptors

5.2.7 Pollutant concentrations have been modelled for proposed receptors for the 2025 'With Development' scenario, as detailed in Table 12.

Table 12: Predicted Adjusted NO_2, and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Proposed Sensitive Receptors for Scenario 3

Proposed Receptor	Calculated Annual Mean Concentrations (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
PR 1	17.41	11.06	7.24
PR 2	15.56	10.88	7.13
PR 3	17.86	11.10	7.26

5.2.8 The results of the assessment show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations within the proposed development site are well below the relevant objectives and limit values.

Assessment of Significance for Human Receptors

5.2.9 The significance of the overall effects of the proposed development has been assessed in accordance with the EPUK/IAQM guidance. This assessment is based on professional judgement and details of the assessor's experience is included in **Appendix D**.

5.2.10 The assessment of significance has taken into account a number of factors, including:

- The assessment has undertaken a sensitivity analysis in which 2018 background pollutant concentrations have been applied to the 2025 opening/future year. This is considered to be an overly robust approach as there is likely to be some improvement in pollutant concentrations in the future;
- Baseline pollutant concentrations in 2018 and 2025 are below the relevant annual mean objectives and limit values at all existing receptors considered; and
- The assessment predicts a negligible impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at all existing sensitive receptors considered, with the development in place.
- Pollutant concentrations within the proposed development are predicted to be below the relevant annual mean objectives and limit values at all proposed receptors considered.

5.2.11 Based on the above factors, in accordance with the EPUK/IAQM guidance, the air quality effect of the proposed development is considered to be **not significant**.

Recommendations for Mitigation

5.2.12 The impact of the proposed development is predicted to be not significant for human receptors. However, mitigation measures will assist in reducing any potential impact and general best practice measures in relation to air quality could be implemented. These could include the utilisation of low NO_x boilers, the implementation of a green travel plan, and provision of electric vehicle charging points.

6 CONCLUSIONS

6.1 Construction Phase

6.1.1 The construction phase assessment has been undertaken to determine the risk and significance of dust and fine particulate matter effects from demolition, earthworks, construction and trackout associated with the proposed development, in accordance with guidance published by the IAQM.

6.1.2 With site specific mitigation measures in place, the significance of dust and fine particulate effects from earthworks, construction and trackout is considered to be **not significant**.

6.2 Operational Phase

Existing Sensitive Receptors

6.2.1 An air quality assessment has been undertaken to consider the potential impact of development generated vehicles on air quality at twenty-five existing sensitive human receptors.

6.2.2 The air quality assessment has applied 2018 background pollution concentrations and vehicle emission factors to the 2025 opening/future year to provide a robust conservative approach.

6.2.3 Pollutant concentrations in 2025, with the development in place, are below the relevant annual mean objectives and limit values at the receptors considered.

6.2.4 The assessment predicts that the development will have a negligible impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at all twenty-five existing sensitive receptors considered in 2025. The effect of the proposed development on human receptors is therefore considered to be **not significant.**

Recommendations for Mitigation

6.2.5 The impact of the proposed development is predicted to be not significant. However, mitigation measures will assist in reducing any potential impact and general best practice measures in relation to air quality could be implemented. These could include the utilisation of low NO_x boilers, the implementation of a green travel plan and provision of electric vehicle charging points.

6.3 Summary

6.3.1 The assessment demonstrates that the proposed development will not lead to an unacceptable risk from air pollution, nor will it lead to any breach of national objectives as required by national policy. There are no material reasons in relation to air quality why the proposed scheme should not proceed.

APPENDICES

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Appendix A: Air Quality Legislation and Guidance

European Legislation

A.1 The European Union (EU) Ambient Air Quality Directive 2008/50/EC[1] (i.e. the CAFE Directive) came into force in June 2008. This EU Directive consolidates previous air quality legislation, with the exception of the 4th daughter Directive[2], and sets air quality limit values for seven pollutants. The Directive also provides a regulatory framework for fine particulate matter smaller than 2.5µm in diameter ($PM_{2.5}$).

A.2 EU Directive 2008/50/EC was transposed into legislation in the UK on 11th June 2010 as The Air Quality Standards Regulations 2010[3].

National Air Quality Strategy

A.3 The Environment Act 1995 requires the UK government to prepare a national Air Quality Strategy. The first UK strategy was published in March 1997, setting out policies for the management of ambient air quality. This was subsequently updated in 2007[4].

A.4 The 2007 strategy establishes the framework for air quality management in England, Scotland, Wales and Northern Ireland. Air quality standards and objectives are set out for eight pollutants which may potentially occur at levels that give cause for concern. The strategy also provides details of the role that local authorities are required to take in working towards improvements in air quality, known as the Local Air Quality Management (LAQM) regime.

Air Quality Standards and Objectives

A.5 Air quality standards and objectives are set out in the strategy for the following pollutants: nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), lead (Pb), fine particulate matter (PM_{10}), benzene (C_6H_6), 1, 3–butadiene (C_4H_6) and ozone (O_3).

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[2] Directive 2004/107/EC of the European Parliament and the Council of 15th December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air
[3] The Air Quality Standards Regulations 2010
[4] Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. July 2007

A.6 Objectives for each pollutant, except O_3, were first given statutory status in the Air Quality Regulations 2000[5] and Air Quality (Amendment) Regulations 2002[6]. These objectives are defined in the strategy as:

"the maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale."

A.7 The EU limit values, transposed into UK legislation as The Air Quality Standards Regulations 2010, are mostly the same as the air quality objectives in terms of concentrations; however, there are differences in determining how compliance is achieved.

A.8 Whilst there is no specific objective for $PM_{2.5}$ in England and Wales, a limit value of 25µg/m³ is referred to in the regulations, which has been adopted for use in this assessment (as recommended by the LAQM Helpdesk). An objective has been set for $PM_{2.5}$ in Scotland since early 2016.

A.9 Examples of where these objectives and limit values apply are detailed in the Defra LAQM Technical Guidance document LAQM.TG(16)[7] and are included in Table A1.

Table A1: Examples of Where the Air Quality Objectives Should Apply

Averaging Period	Objectives Should Apply at:	Objectives Should Generally 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 facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties[a]	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

[5] The Air Quality Regulations 2000. SI No 928
[6] The Air Quality (Amendment) Regulations 2002
[7] Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(16), February 2018

Table A1: Examples of Where the Air Quality Objectives Should Apply		
Averaging Period	**Objectives Should Apply at:**	**Objectives Should Generally Not Apply at:**
1-hour mean	All locations where the annual mean and 24 and 8-hour objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks 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 to which the public might reasonably be expected to spend one hour or longer	Kerbside sites where public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	
a. Such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied		

Local Air Quality Management

A.10 LAQM legislation in the Environment Act 1995 requires local authorities to conduct the periodic review and assessments of air quality. These aim to identify all those areas where the objectives are being, or are likely to be, exceeded. Where exceedances are likely to occur, local authorities are required to declare an Air Quality Management Area (AQMA).

A.11 LAQM.TG(16) presents a streamlined approach for LAQM in England and Scotland; however, Wales and Northern Ireland are still considering changes to LAQM and therefore work according to the previous regimes.

A.12 Local authorities in England are required to produce Annual Status Reports (ASRs), and in Scotland, Annual Progress Reports (APRs). These replace all other reports which previously had to be submitted including Updating and Screening Assessments, Progress Reports and Detailed Assessments (which would be produced to assist with an AQMA declaration).

A.13 Local authorities now have the option of a fast track AQMA declaration option. This allows more expert judgement to be used and removes the need for a Detailed

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Assessment where a local authority is confident of the outcome. Detailed Assessments should however still be used if there is any doubt.

A.14 As part of the UK Government's requirement to improve air quality, selected local authorities in England are also currently investigating the feasibility of setting up Clean Air Zones (CAZs). These are areas where targeted action and co-ordinated resources aim to improve air quality within an urban setting, in order to achieve compliance with the EU limit values within the shortest possible time.

A.15 Five local authorities outside of London were initially selected to implement a CAZ by 2020 (Birmingham, Leeds, Nottingham, Derby and Southampton). A further 23 local authorities were subsequently chosen to investigate the feasibility of establishing a CAZ, and 33 local authorities may potentially have to proceed to this stage where compliance is not achieved.

National Planning Policy Framework

A.16 The National Planning Policy Framework (NPPF)[8], introduced in March 2012 and most recently updated in February 2019, requires 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 AQMAs and CAZs, 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 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 AQMAs and CAZs is consistent with the local air quality action plan."

Planning Practice Guidance

A.17 The Planning Practice Guidance (PPG)[9], updated in March 2014, states that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to

[8] Ministry of Housing, Communities and Local Government, National Planning Policy Framework, February 2019
[9] Department for Communities and Local Government. Planning Practice Guidance: Air Quality, March 2014

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

A.18 Where a proposed development is anticipated to give rise to concerns about air quality, an appropriate assessment needs to be carried out. Where the assessment concludes that the proposed development (including mitigation) will not lead to an unacceptable risk from air pollution, prevent sustained compliance with national objectives or fail to comply with the requirements of the Habitats Regulations, then the local authority should proceed to decision with appropriate planning conditions and/or obligations.

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Appendix B: Methodology for Construction Phase Assessment

Institute of Air Quality Management Guidance

B.1 The methodology for the construction phase dust assessment is set out in guidance from the Institute of Air Quality Management (IAQM)[10].

Step 1

B.2 Step 1 is to screen the requirement for a more detailed assessment. The guidance states that an assessment will normally be required where there are existing sensitive human receptors within 350m of the site boundary and/or within 100m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

B.3 With regards to ecological receptors, the guidance states that an assessment will normally be required where there are existing receptors within 50m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

B.4 Where any of these criteria are met, it is necessary to proceed to Step 2.

Step 2

B.5 Step 2 determines the potential risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological impacts. The risk is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc);
- The duration of these activities;
- The size of the site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of receptors to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of receptors to dust.

B.6 The risk of dust impacts is determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based upon the following two factors (known as Step 2A and Step 2B).

[10] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction, February 2014

B.7 **Step 2A** assesses the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large. Examples of how the magnitude may be defined are included in Table B1.

Table B1: Determining the Dust Emission Magnitude of Construction Phase Activities

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >50,000m³; Potentially dusty construction material (e.g. concrete); On-site crushing and screening; Demolition activities >20m above ground level	Total building volume 20,000-50,000m³; Potentially dusty construction material; Demolition activities 10-20m above ground level	Total building volume <20,000m³; Construction material with low potential for dust release (e.g. metal cladding or timber)
Earthworks	Total site area >10,000m²; 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 >8m in height; Total material moved >100,000 tonnes	Total site area 2,500-10,000m²; Moderately dusty soil type (e.g. silt); 5-10 heavy earth moving vehicles active at any one time; Formation of bunds 4-8m in height; Total material moved 20,000-100,000 tonnes	Total site area <2,500m²; Soil type with large grain size (e.g. sand); <5 heavy earth moving vehicles active at any one time; Formation of bunds <4m in height; Total material moved <20,000 tonnes; Earthworks during wetter months
Construction	Total building volume >100,000m³; On-site concrete batching; Sandblasting	Total building volume 25,000-100,000m³; Potentially dusty construction material (e.g. concrete); On-site batching	Total building volume <25,000m³; Construction material with a low potential for dust release (e.g. metal cladding or timber)
Trackout	>50 HDV (>3.5t) outward movements[a] in any one day[b]; Potentially dusty surface material (e.g. high clay content); Unpaved road length >100m	10-50 HDV (>3,5t) outward movements[a] in any one day[b]; Moderately dusty surface material (e.g. high clay content); Unpaved road length 50-100m	<10 HDV (>3.5t) outward movements[a] in any one day[b]; Surface material with low potential for dust release; Unpaved road length <50m

a. A vehicle movement is a one way journey i.e. from A to B, and excludes the return journey
b. HDV movements during a construction project may vary over its lifetime, and the number of movements is the maximum not the average

B.8 **Step 2B** considers the sensitivity of the area to dust impacts which is defined as low, medium or high. The sensitivity categories for different types of receptors are described in Table B2.

Table B2: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects

Sensitivity Category	Dust Soiling Effects	Health effects of PM_{10}	Ecological Effects
High	Users can reasonably expect to enjoy a high level of amenity; Appearance, aesthetics or value of a property would be diminished; Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car show rooms	Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM_{10}; Examples include residential properties, hospitals, schools, and residential care homes	Locations with an international or national designation and the designated features may be affected by dust soiling; Locations where there is a community of a particularly dust sensitive species; Examples include a Special Area of Conservation with dust sensitive features
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; The appearance, aesthetics or value of their property could be diminished; People or property wouldn't reasonably be expected to be continuously present or regularly for extended periods of time; Examples include parks and places of work	Locations where people are exposed as workers and exposure is over a period of time relevant to the air quality objective for PM_{10}; Examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; Locations with a national designation where the features may be affected by dust deposition; Examples include a Site of Special Scientific Interest with dust sensitive features

Table B2: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects			
Sensitivity Category	**Dust Soiling Effects**	**Health effects of PM_{10}**	**Ecological Effects**
Low	Enjoyment of amenity would not reasonably be expected; Property would not be diminished in appearance, aesthetics or value; People or property would be expected to be present only for limited periods of time; Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads	Locations where human exposure is transient; Examples include public footpaths, playing fields, parks and shopping streets	Locations with a local designation where the features may be affected by dust deposition; Examples include a Local Nature Reserve with dust sensitive features

B.9 Based on the sensitivity of individual receptors, the overall sensitivity of the area to dust soiling, human health and ecological effects is then determined using the criteria detailed in Tables B3 to B5, respectively.

Table B3: Sensitivity of the Area to Dust Soiling Effects on People and Property[ab]					
Receptor Sensitivity	**Number of Receptors**	**Distance from Source (m)[c]**			
		<20m	**<50m**	**<100m**	**<350m**
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

a. The sensitivity to the area should be derived for each of the four activities
b. Estimate the total number of receptors within the stated distance. Only the highest level of sensitivity from the table needs to be considered
c. For trackout, distances should be measured from the side of the roads used by construction traffic. Without site specific mitigation, trackout may occur for up to 500m from large sites, 200m from medium sites and 50m from small sites, 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 B4: Sensitivity of the Area to Human Health Impacts[ab]							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration[c]**	**Number of Receptors[d]**	**Distance from Source (m)[e]**				
			<20m	**<50m**	**<100m**	**<200m**	**<350m**
High	>32μg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32μg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28μg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24μg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32μg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32μg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28μg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24μg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

a. The sensitivity to the area should be derived for each of the four activities
b. Estimate the total number of receptors within the stated distance. Only the highest level of sensitivity from the table needs to be considered
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 exceedance of the 24-hour mean objective is likely in England, Wales and 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, distances should be measured from the side of the roads used by construction traffic

Table B5: Sensitivity of the Area to Ecological Impacts[ab]		
Receptor Sensitivity	**Distance from the Source (m)[c]**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

a. *The sensitivity to the area should be derived for each of the four activities*
b. *Only the highest level of sensitivity from the table needs to be considered*
c. *For trackout, distances should be measured from the side of the roads used by construction traffic*

B.10 These two factors are combined in **Step 2C** to determine the risk of dust impacts with no mitigation applied.

B.11 The risk of dust effects is determined for four types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The four types of activities to be considered are:

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

B.12 The risk of dust being generated by demolition activities at the site is determined using the criteria in Table B6.

Table B6: Risk of Dust Impacts for Demolition			
Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

B.13 The risk of dust being generated by earthworks and construction at the site is determined using the criteria in Table B7.

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Table B7: Risk of Dust Impacts for Earthworks and Construction			
Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

B.14 The risk of dust being generated by trackout at the site is determined using the criteria in Table B8.

Table B8: Risk of Dust Impacts for Trackout			
Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Medium Risk	Low Risk	Negligible

Step 3

B.15 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures are detailed in guidance published by the Greater London Authority[11], recommended for use outside the capital by LAQM guidance, and the IAQM guidance document itself. Professional judgement should be used to determine the type and scale of mitigation measures required.

B.16 If the risk is classed as negligible, no mitigation measures beyond those required by legislation will be necessary.

Step 4

B.17 Step 4 assesses the residual effect, with mitigation measures in place, to determine whether or not these are significant.

[11] Greater London Authority, The Control of Dust and Emissions from Construction and Demolition: Best Practice Guidance, 2006

Professional Judgement

B.18 The IAQM guidance makes reference to the use of professional judgement when assessing the risks of dust and fine particulate matter from demolition and construction sites. Details of the experience of the personnel involved with the project are provided in **Appendix D**.

Appendix C: Methodology for Operational Phase Assessment

Air Dispersion Modelling Inputs

C.1 The air dispersion model ADMS-Roads (CERC, Version 4.1) has been used to assess the potential air quality impacts associated with development-generated road traffic emissions. This dispersion model is widely used and accepted for the purpose of undertaking assessments to support both planning and Environmental Permit applications.

Traffic Flow Data

C.2 The ADMS-Roads model requires the input of detailed road traffic flow data for those routes which may be affected by the proposed development. Traffic flow data has been provided for this project by Ashley Helme, the appointed transport consultants for the project. The study extent of the model is shown in Figure C.1.

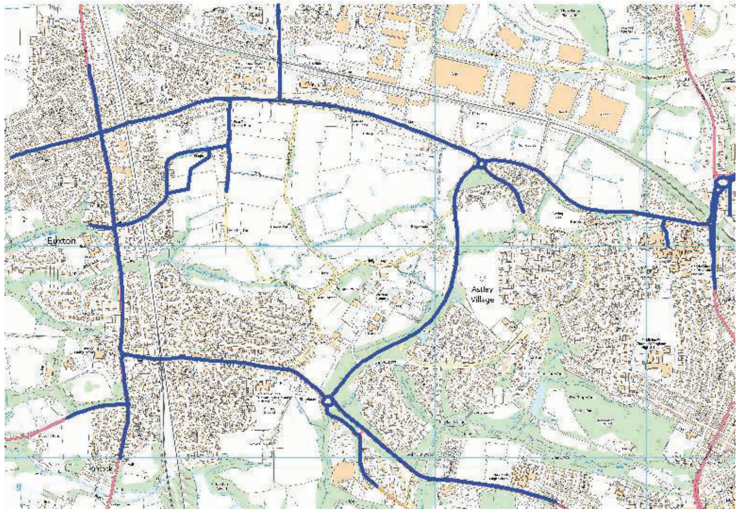

Figure C.1: Study Extent of Air Dispersion Model. The roads modelled in the assessment can be seen in blue (*'Reproduced from Ordnance Survey Maps © Crown Copyright All Rights Reserved Licence No. 0100031673'*)

C.3 Data has been provided as 24-hour Annual Average Daily Traffic (AADT) flows, with HGV percentages. No average speed information was available and therefore speed limits have been used, with a reduction to 20kph in locations where congestion or the slowing down of vehicles would be expected.

C.4 The traffic flow data used in the assessment is included in Table C1.

Table C1: 24-hour AADT traffic data used in the assessment

Link	Link Name	Speed Info (kph)	Scenario 1: 2018 Verification and Base Year		Scenario 2: 2025 Without Development		Scenario 3: 2025 Opening/Future Year, With Development	
			LGV	HGV	LGV	HGV	LGV	HGV
1	School Lane (N)	48	1453	12	1666	13	416	3
2	Site Access	48	0	0	0	0	1742	18
3	School Lane (S)	48	1453	12	1666	13	2161	17
4	Site Access	48	0	0	0	0	1889	19
5	School Lane (E)	96	1517	12	1739	14	2322	19
6	School Lane (W)	96	1517	12	1739	14	429	3
7	A49 (N)	48	10653	251	11702	275	11911	280
8	School Lane	32	1890	15	2050	17	2536	20
9	A49 (S)	48	10611	239	11656	262	11925	268
10	Unnamed Road	32	1334	12	1447	13	1447	13
11	A49 (N)	48	9095	186	10278	210	10709	219
12	Euxton Lane	48	12513	178	15111	215	15334	218
13	A49 (S)	48	10783	265	12371	304	12580	309
14	Runshaw Lane	48	11755	179	13456	205	13456	205
19	Euxton Lane (E)	48	15516	204	18855	248	19262	254
20	Pear Tree Lane	96	1887	4	2047	4	2684	5
21	Euxton Lane (W)	48	15614	206	18961	250	19372	255
22	Euxton Lane (W)	64	15546	189	18900	230	19308	235
23	Central Avenue	64	14583	222	19782	301	19782	301
24	Euxton Lane (E)	64	17988	237	22002	290	22409	295
25	Euxton Lane (N)	64	17741	399	21334	480	21738	489
26	Euxton Lane (E)	64	19499	645	22281	737	22681	750
27	Chancery Road	48	3719	99	4258	114	4258	114
28	West Way	64	16003	563	18066	636	18066	636
29	Euxton Lane (E)	64	20106	708	22568	794	22967	808
30	Hospital Access	48	4607	142	5502	170	5502	170
31	Euxton Lane (W)	64	19965	660	22923	758	23322	771
32	A6 (N)	48	36033	1268	39305	1383	39595	1394
33	A6 S)	48	25031	935	28028	1047	28137	1051
34	Euxton Lane	64	20257	713	22728	800	23126	814
35	A6 (N)	64	15673	825	18555	977	18575	978
36	A674	80	32556	1251	36758	1412	37026	1423
37	Hazel Grove	48	701	0	760	0	760	0
38	A6 (S)	48	36063	1269	39338	1385	39628	1395
45	West Way	64	18530	573	20093	621	20093	621
46	Southport Road (E)	64	15306	376	16612	408	16673	410
47	Foxhole Road	48	15153	373	16445	404	16498	406
48	Southport Road (W)	48	17680	566	19200	614	19314	618
49	A49 (N)	48	11041	341	12026	372	12293	380
50	Balshaw Lane	48	16138	585	17528	636	17641	640
51	A49 (S)	48	15245	537	16555	583	16708	588
52	A49 (N)	48	10913	396	11868	430	11994	435
53	A49 (S)	48	8509	299	9256	326	9352	329
54	Dawbers Lane	48	8105	311	8798	338	8855	340

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C.5 The traffic data has included the following committed developments as part of the future traffic flows for scenario 2 and 3:

- Buckshaw Village,
- Matrix Park,
- Strategic Regional Site (Revolution Park),
- Southern Commercial Area,
- Group 1 Area,
- Group 4 Area,
- Group 10 Area,
- Land east of Wigan Road (Phase 1 & 2),
- Land east of Wigan Road (Redrow),
- Land at Euxton Lane

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Vehicle Emission Factors

C.6 The air quality assessment has used vehicle emission factors calculated using the Emissions Factor Toolkit (EFT) version 9.0, released in May 2019. This is the most up-to-date version of the EFT currently available.

C.7 As discussed in the section 3.5 of the report, there are uncertainties involved with the prediction of future NO_2 concentrations and therefore the air quality assessment has applied 2018 background pollution concentrations and vehicle emission factors to the 2025 opening/future year to provide a robust conservative approach.

Street Canyons

C.8 The principal effects of a street canyon on the dispersion of pollution from a road source are:

- Pollution is channelled along the canyon;
- Pollution is dispersed across the canyon by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon between gaps in the buildings;
- Pollutants leave the canyon from the canyon top; and
- Pollutants leave the canyon from the downstream end of the canyon.

C.9 The model has not included any street canyons as part of the assessment.

Meteorological Data

C.10 The meteorological data used in the air quality modelling has been obtained from ADM Limited and is from the Rostherne No.2 recording station, covering the period between 1st January and 31st December 2018. This has complete data capture for wind and temperature.

C.11 The Rostherne No.2 recording station is located approximately 38km from the proposed development and is considered to be the most representative of the conditions at the proposed development, due to its relative location and similar altitude.

C.12 The 2018 wind rose for the Rostherne No.2 Meteorological Recording Station is shown in Figure C2.

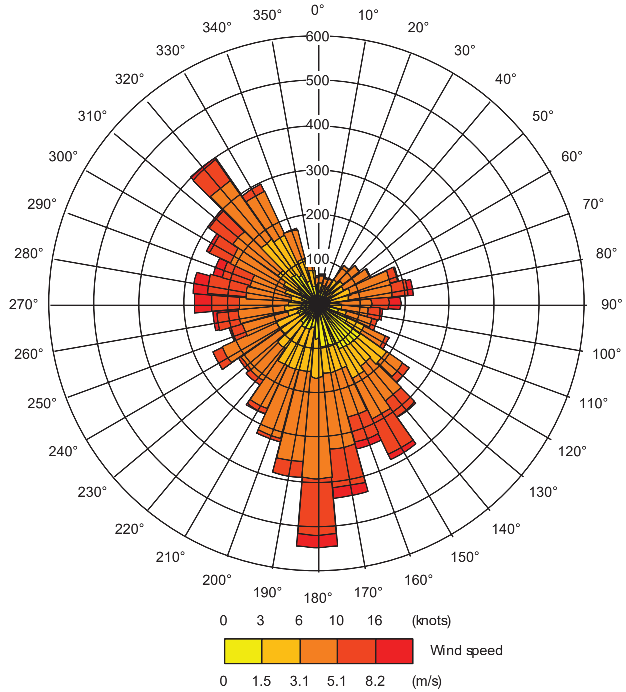


Figure C.2: 2018 Wind Rose for the Rostherne No.2 Meteorological Station

Dispersion and Meteorological Site Characteristics

C.13 The characteristics for the dispersion site and meteorological sites, included in the ADMS-Roads model, are detailed in Table C2.

Table C2: Dispersion and Meteorological Site Characteristics		
Setting	**Dispersion Site**	**Meteorological Site**
Surface Roughness	0.5m	0.02m
Surface Albedo	0.23	0.23
Minimum Monin-Obukhov Length	30m	1m
Priestley-Taylor Parameter	1	1

NO_x to NO_2 Conversion

C.14 In accordance with the guidance within LAQM.TG(16), the ADMS-Roads model has been run to predict the road-contribution NO_x concentrations for each receptor location. These have then been converted to NO_2 concentrations using the Defra NO_x to NO_2 calculator[12].

Model Validation and Verification

C.15 LAQM.TG(16) refers to model validation as *"the general comparison of modelled results against monitoring data carried out by model developers"*. ADMS-Roads is widely accepted by regulatory authorities for use in this type of assessment.

C.16 Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads air dispersion model is achieved by modelling concentration(s) at existing monitoring location(s) in the vicinity of the proposed development, and comparing the modelled concentration(s) with the measured concentration(s).

C.17 Following review of the 2018 Annual Status Report (ASR) for Chorley District Council (CDC), it is understood there are two air quality monitoring locations in the vicinity of the proposed development site. CH09 is a roadside location whilst CH11 is a kerbside location. It is considered appropriate to include the kerbside location in the verification procedure as it is representative of houses adjacent to the road. Therefore, both diffusion tubes have been used to verify the results of the model.

C.18 As no PM_{10} or $PM_{2.5}$ monitoring locations are situated along roads where traffic flow data is available, it has not been possible to carry out model verification for modelled PM_{10} or $PM_{2.5}$ concentrations.

C.19 Although the 2019 ASR has not yet been published, the 2018 diffusion tube data used in the assessment was provided by Ms Lesley Miller, Regulatory Services Manager at CDC via email on 26th April 2019.

C.20 The monitoring data that has been used in the model verification procedure is detailed in Table C3.

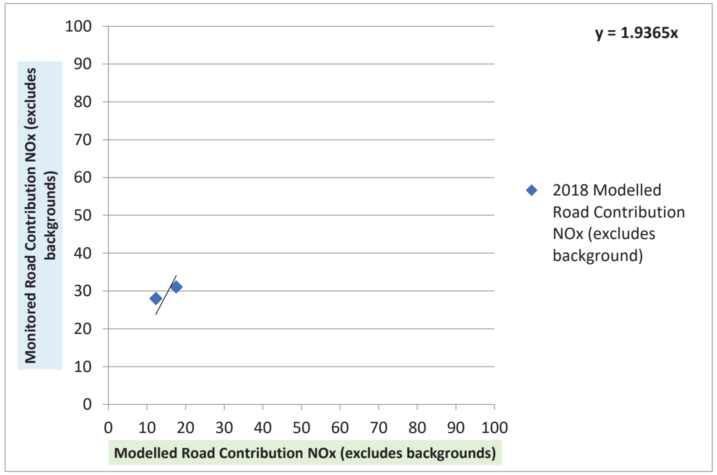
[12] Defra Local Air Quality Management web pages (http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html)

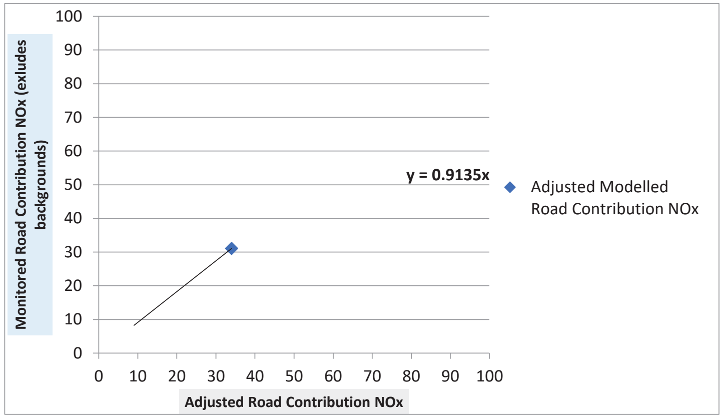
Table C3: NO_2 Monitoring Data Used for Verification Purposes

Monitoring Location Reference	Type	Approximate Grid Reference		2018 Bias Adjusted NO_2 Annual Average Concentration (µg/m³)
		Easting	Northing	
CH09	Roadside Diffusion Tube	355550	418243	28.55
CH11	Kerbside Diffusion Tube	355454	419317	26.62

C.21 The modelled road-contribution NO_x concentrations for the diffusion tubes have been compared against the measured road-contribution NO_x concentrations for the same locations. The measured concentration has been derived using the Defra NO_x to NO_2 calculator, taking into account the background NO_x concentration for the local area.

C.22 The comparison is shown in the graph below. The equation of the trend line is based on linear regression through zero, which provides an overall adjustment factor of 1.9365.





C.23 This adjustment factor has been applied to the modelled road-contribution NO_x concentrations. The total NO_2 concentrations have been derived by combining the adjusted road-contribution NO_x concentration and background NO_2 concentration, using the Defra NO_x to NO_2 calculator.

C.24 A final comparison has been made between the total measured NO_2 concentrations and total modelled NO_2 concentrations, as shown in Table C4. Following adjustment, modelled concentrations are within 10% of measured concentrations.

Table C4: Comparison Between Measured and Monitored NO_2 Concentrations

Monitoring Location Reference	Measured Total NO_2 Concentration ($\mu g/m^3$)	Modelled Total NO_2 Concentration ($\mu g/m^3$)	Difference (%)
CH09	28.55	29.91	4.76
CH11	26.62	24.61	-7.55

C.25 A Root Mean Square Error (RMSE) calculation has been undertaken as part of the model verification for NO_2 concentrations. This has been carried out for the monitoring location included within the model verification, in accordance with the guidance detailed in LAQM.TG(16).

C.26 The RMSE calculation following adjustment is detailed in Table C5.

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Table C5: RMSE Calculation for Nitrogen Dioxide Concentrations

Diffusion Tube Location	After Verification			
	Observed Value	Predicted Value	Difference	RMSE
CH09	28.55	29.91	-1.36	**1.72**
CH11	26.62	24.61	2.01	

C.27 LAQM.TG(16) states that *"ideally an RMSE value within 10% of the objective would be derived"*, a value of within 25% is considered acceptable.The results of the calculation show that following model verification, the RMSE value is 1.72$\mu g/m^3$ which eqautes to 4.3%. This is within 10% (i.e. 4$\mu g/m^3$) of the objective (i.e. 40$\mu g/m^3$) and therefore, the model is considered to be performing to an acceptable standard.

Assessment Criteria

Assessing the Impact of a Proposed Development on Human Receptors

C.28 Guidance has been prepared by Environmental Protection UK (EPUK) and the IAQM[13] with relation to the assessment of the air quality impacts of proposed developments and their significance.

C.29 The impact of a development is usually assessed at specific receptors, and takes into account both the long-term background concentrations, in relation to the relevant Air Quality Assessment Level (AQAL) at these receptors, and the change with the development in place.

C.30 The impact descriptors for individual receptors are detailed in Table C6.

Table C6: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year*	Percentage 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

[13] Moorcroft and Barrowcliffe et al, Land-Use Planning and Development Control: Planning for Air Quality (v1.2), January 2017

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Table C6: Impact Descriptors for Individual Receptors				
Long Term Average Concentration at Receptor in Assessment Year*	**Percentage Change in Concentration Relative to Air Quality Assessment Level (AQAL)***			
	1%	**2-5%**	**6-10%**	**>10**
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
**Percentage pollutant concentrations have been rounded to whole numbers, to make it easier to assess the impact. Changes of 0% (i.e. less than 0.5% or 0.2µg/m^3) should be described as Negligible*				

Determining the Significance of Effects

C.31 Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as either 'significant' or 'not significant'.

C.32 Once the impact of the proposed development has been assessed for the individual impacts, the overall significance is determined using professional judgement. This takes into account a number of factors such as:

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

Appendix D: Professional Experience of Assessors

D.1 The assessment of air quality impacts, and the significance of the associated effects, takes into account the professional judgement of the assessor. Details of the experience of the personnel involved with the project are provided below:

Paul Threlfall — **Environmental Scientist (Air Quality)**
BSc MSc

Paul joined Wardell Armstrong in October 2017 as an Air Quality Scientist, after completing his MSc Water, Energy and the Environment at Liverpool John Moores University. The majority of his work is carried out in support of planning applications and, therefore, he has experience of undertaking air quality assessments for a wide range of projects including residential developments, commercial developments and mixed-use developments. Paul has a good range of skills and knowledge of air quality modelling and monitoring through his involvement in air quality projects, both as individual commissions and as part of Environmental Impact Assessments (EIAs). Paul also has extensive knowledge and experience of undertaking odour assessments, ranging from qualitative desk-based assessments to more detailed odour dispersion modelling assessments including odour 'sniff test' observations.

Malcolm Walton — **Technical Director**
BSc (Env Health) Dip (Acoustics & Noise Control)
MCIEH AMIOA

Malcolm holds a Bachelor of Science degree in Environmental Health and the Diploma in Acoustics and Noise Control. Malcolm is a Member of the Chartered Institute of Environmental Health and an Associate Member of the Institute of Acoustics. Malcolm joined Wardell Armstrong in September 2001 following 12 years working as an Environmental Health Officer in several local authorities, responsible for the enforcement of environmental legislation and in particular air pollution and noise nuisance. Malcolm has experience in the technical co-ordination of environmental appraisal of large schemes to UK and international standards. Malcolm regularly carries out and co-ordinates noise and air quality assessment work associated with planning applications including EIA work and PPC permit application/compliance. He regularly acts as expert witness in planning inquiries in respect of noise, air quality and odour.

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DRAWINGS

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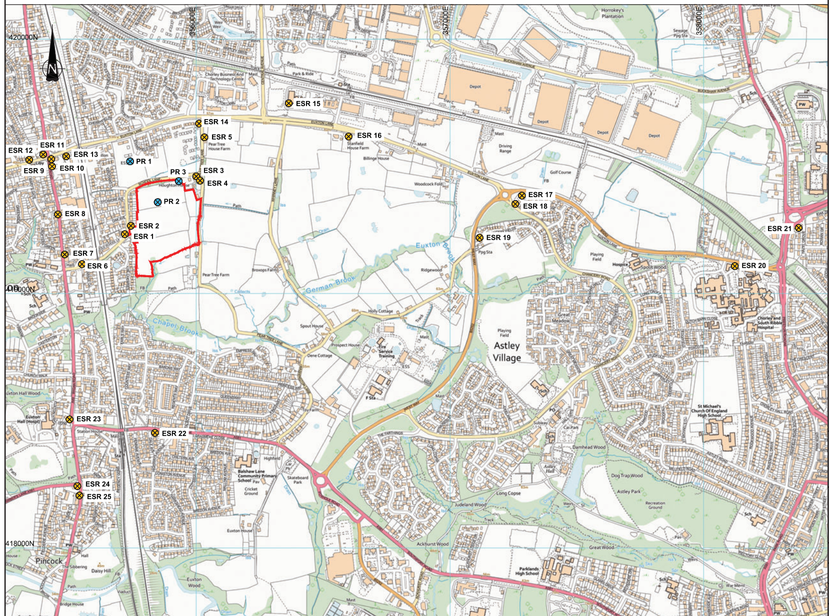

DO NOT SCALE FROM THIS DRAWING

KEY

STUDY AREA BOUNDARY

ESR — EXISTING SENSITIVE RECEPTOR LOCATION

PR — PROPOSED RECEPTOR LOCATION

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	First Issue	24/05/19	SJB	PT	MW

CLIENT
Gladman Developments Limited

PROJECT
Pear Tree Lane, Euxton

DRAWING TITLE
Existing and Proposed Sensitive Receptor Locations

DRG No.		REV
GM10466-001		A
DRG SIZE A3	SCALE 1:10000	DATE 03-05-19
DRAWN BY DR	CHECKED BY PT	APPROVED BY MW

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