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LIDL GB LTD

MONKS CROSS, YORK

AIR QUALITY ASSESSMENT

OCTOBER 2023

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AIR QUALITY ASSESSMENT

OCTOBER 2023

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APPENDICES

DRAWINGS	TITLE	SCALE
GM13057-001	Existing Sensitive Receptor Locations	1:2,500

EXECUTIVE SUMMARY

An air quality assessment has been undertaken to accompany a planning application for a proposed food store and drive-thru restaurant at a site off Monks Cross, York. The proposals include the demolition of the former commercial space and the construction of a food-store containing 124 car parking spaces and a drive-thru restaurant containing 13 car parking spaces.

The assessment has considered dust and fine particulate matter during the construction phase, and road traffic emissions during the operational phase.

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

For the operational phase assessment, annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations have been modelled at four existing receptor locations, using the most recent Emission Factor Toolkit available from DEFRA (EFT v11.0). Predicted annual mean concentrations have been compared to the relevant air quality objectives and target level.

The operational phase assessment has concluded that the development will result in concentrations of NO_2, PM_{10} and $PM_{2.5}$ remaining well below the air quality objectives/target values, both without and with the development for the proposed 2026 Opening/Future Year. The impact of the development is predicted to be negligible at all four existing sensitive receptors that were assessed. Air quality effects are therefore considered to be 'not significant'.

The assessment has demonstrated 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.

1 INTRODUCTION

1.1 Background

1.1.1 Wardell Armstrong LLP has been commissioned by Lidl GB Ltd to undertake an air quality assessment to accompany a planning application for a proposed food store and drive-thru restaurant development off Monks Cross Drive, York.

1.1.2 The proposed development site is currently an unoccupied commercial space, to the west of Monks Cross Drive. The site is bordered by existing commercial buildings to the south and east, whilst to the north, there are existing office buildings. Existing distribution centres lie adjacent to the west of the site.

1.1.3 From the information provided, it is understood that the development proposals are for the demolition of the existing onsite commercial buildings and the construction of a food store containing 124 car parking spaces, to the south of the site. The development proposals also include the construction of a drive-thru restaurant to the north of the site, containing 13 car parking spaces.

1.1.4 This report details the results of the air quality assessment undertaken to accompany a 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.

1.1.5 Air pollutant concentrations are considered at existing sensitive receptor locations in the vicinity of the proposed development. As the development is commercial, no proposed sensitive receptors have been included in the assessment, however, the model has included consideration of idling vehicles within the development site.

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:

- The Environment Act 1995, amended in 2021;
- 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(22), August 2022;
- Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction, August 2023;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework, September 2023;
- Department for Communities and Local Government, Planning Practice Guidance: Air Quality, November 2019; and
- City of York Council, Low Emissions Supplementary Planning Guidance, June 2022.

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

Table 1: Air Quality Objectives and Limit Values Relevant to the Assessment*			
Pollutant	Objective/Limit Value	Averaging Period	Obligation
Particulate Matter ($PM_{2.5}$)	Limit Value of 20µg/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.

2.2.3 The City of York Council (CYC) 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023) classifies the proposed development as a 'Type 2' site. A site is classified as 'Type 2' based on the land used type; a 'food retail' site (use class E) is classified as 'Type 2' if the general floor area is greater than 800m^2.

2.2.4 A 'Type 3' site would be one which causes an increase in total AADT over 1000, for developments outside of an Air Quality Management Area (AQMA).

2.2.5 Bryan G Hall, the appointed transport consultant on the scheme, states that the number of new trips, generated by the proposed development, totals 336. Therefore, in accordance with the CYC 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023), the site is not classified as a 'Type 3' development.

3 ASSESSMENT METHODOLOGY

3.1 Consultation and Scope of Assessment

3.1.1 The assessment methodology was discussed and agreed with Mr Andrew Gillah, Local Authority Officer at City of York Council (CYC), via email correspondence on 20th September 2023.

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
	2019 meteorological data from Linton on Ouse recording station	No objection to method.
	Background concentrations from 2018 - based DEFRA default maps	No objection to method.
	Assessment undertaken using EFT v11.0 emission factors.	No objection to method.
	Model verification using roadside diffusion tube 5.	No objection to method.

3.1.3 Mr Gillah provided further feedback to the methodology, stating that the site would need to be classified in line with the City of York Council, Low Emissions Supplementary Planning Guidance, June 2022. This is discussed further in section 5.3.

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].

[1] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction (v1.1), August 2023

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 mostly residential and are detailed in Table 3. However, it should be noted that the assessment includes consideration of all sensitive receptors within 250m of the site boundary, in accordance with IAQM guidance.

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

Receptor	Direction from the Site	Approximate Distance from the Site Boundary (m)
Existing place of work/commercial premise off Monks Cross Drive	North	Approximately 49m at closest point
Existing place of work/ commercial premise on Monks Cross Shopping Park, off Monks Cross Drive	East	Approximately 71m at closest point
Existing place of work/ commercial premise off Monks Cross Drive	South	<20m at closest point
Existing place of work/ commercial premise off Jockey Lane	South west	Approximately 93m at closest point
Existing place of work/ commercial premise off Jockey Lane	West	Approximately 86m at closest point

3.2.3 There are no ecological receptors, or potentially dust sensitive statutory designated habitat sites, within 50m of the site and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s). Ecological effects do not therefore 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.

3.3 Operational Phase Assessment

3.3.1 The air dispersion model ADMS-Roads (CERC, Version 5.0.1) 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 receptors, as these are the pollutants considered most likely to exceed the objectives and limit values.

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

- Scenario 1: 2019 Verification and Base Year, the most recent year for which traffic flow information, local monitored pollution data and meteorological data is available;
- Scenario 2: 2026 Opening/Future Year, without the proposed development in place; and
- Scenario 3: 2026 Opening/Future Year, with the proposed development in place.

3.3.4 The appointed transport consultant for the proposed development, Bryan G Hall, stated that: for food store developments, it is accepted that not all vehicle trips to the site are 'new' to the development- many trips are already on the network and can be considered to be pass-by or diverted trips, transferred trips, or linked trips.

3.3.5 For the air dispersion modelling, all vehicle trips have been considered to be new to the network. Bryan G Hall states that "This is a significant over-estimate of the actual impact…". Therefore, the assessment is considered to be robust and represents a 'worst-case' scenario.

Existing Sensitive Receptors

3.3.6 A number of representative existing sensitive receptors (identified as ESR 1 to ESR 4) 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.

3.3.7 The operational phase assessment does not include assessment of impacts at existing receptors along New Lane. Bryan G Hall stated that it is beyond the scope agreed between Bryan G Hall and York Highways and therefore the data is not available for use within the air quality assessment. However, when considering the 'new trips'

[2] Moorcroft and Barrowcliffe et al, Land-Use Planning and Development Control: Planning for Air Quality (v1.2), January 2019

generated by the proposed development, data provided by Bryan G Hall show that number of vehicles traveling west along Jockey Lane towards New Lane, is 95 AADT. This is below the 500 AADT criteria presented within the guidance by EPUK and the IAQM, for when a detailed air quality assessments would be required.

3.3.8 Details of these receptors considered are provided in Table 4, and their locations are shown on drawing GM13057-001.

Table 4: Existing Sensitive Receptors Considered in Operational Phase Assessment

Receptor	Address	Grid Reference		Receptor Type
		Easting	Northing	
ESR 1	Forge Close, Huntington York	462089	454881	Residential
ESR 2	Forge Close, Huntington York	462010	454884	Residential
ESR 3	Saddlers Close, Huntington York	461893	454881	Residential
ESR 4	Saddlers Close, Huntington York	461857	454876	Residential

3.3.9 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.

3.4 Limitations and Uncertainties

3.4.1 Air quality assessments make use of official sources of information (i.e. vehicle emission factors and background concentrations) which have historically been considered to be overly optimistic. Monitoring data collected by the UK Government and local authorities over the past few years has shown that annual mean NO_2 concentrations remained higher than previously expected (especially in roadside locations). This was 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.

3.4.2 The vehicle emission factors used in this assessment are from Defra's Emission Factor Toolkit (EFT v11.0)[3], which is the most up-to-date version available.

3.4.3 A position statement was produced by the IAQM in 2018 which dealt specifically with the use of EFT v8.0 and the consideration of uncertainties in predicting future air quality[4]. The statement concluded that the approaches for dealing with this uncertainty should be decided on a case-by-case basis, but may include the use of a sensitivity test (i.e. where it is assumed that NO_x emissions will not reduce as quickly over time as within the EFT).

3.4.4 A later study provided evidence that EFT v9.0 may be relied upon to predict the 'most likely' future emissions reductions, as long as model verification has been undertaken using monitored data from 2016 or later[5].

3.4.5 The IAQM has recently withdrawn their 2018 position statement on the consideration of uncertainties in predicting future air quality[6]. A growing body of evidence suggests that the latest COPERT vehicle emission factors used in EFT v9.0 (and later) reflect real-world NO_x emissions more accurately. As a result, the IAQM judge that "an exclusively vehicle emissions-based sensitivity test is no longer necessary". This is provided that the assessment has been verified using monitoring data from 2016 or later.

3.4.6 In accordance with Defra guidance, the air quality assessment has been carried out using EFT v11.0. As model verification has been undertaken, following the latest guidance from the IAQM, it is not considered necessary to carry out a sensitivity analysis. Further information on the vehicle emission factors used in the assessment are provided in Appendix C.

3.4.7 Several steps have been taken to ensure the model is as accurate and representative as possible. These comprise:

- Consultation has been undertaken with CYC to confirm their agreement with the methodology used within the assessment;
- Detailed traffic data has been obtained from the appointed transport consultant which assumes all traffic movements associated with the proposed

[3] Defra Local Air Quality Management webpages (https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html)
[4] Institute of Air Quality Management, Dealing with Uncertainty in Vehicle NO_x Emissions within Air Quality Assessments v1.1, July 2018
[5] Air Quality Consultants, Performance of Defra's Emission Factor Toolkit 2013 – 2019, February 2020
[6] Available on the Institute of Air Quality Management website (https://iaqm.co.uk/wp-content/uploads/2013/02/iaqm_uncertainty_vehicle_NOx_emission_withdrawn-02.pdf)

development will be 'new trips'. This is considered to be overly robust as not all vehicle trips to the site will be 'new' to the development- many trips will already be on the network and can be considered to be pass-by or diverted trips, transferred trips, or linked trips.

- The latest Defra LAQM tools have been incorporated into the assessment following their release in November 2021;
- Meteorological data, obtained from a representative meteorological recording station, has been incorporated into the assessment;
- Road widths and the location of ESRs in relation to each road have been measured in detail to ensure greater accuracy within the model; and
- The nearby Council-operated diffusion tube monitoring location (REF: 5) has been considered within the assessment to allow model verification to take place. Model verification factor(s) have been applied to NO_x concentrations, which are then input into the Defra NO_x to NO_2 calculator tool to predict total NO_2 concentrations at each receptor considered in the assessment.

4 BASELINE SITUATION

4.1 City of York Council Local Air Quality Management

4.1.1 The proposed development site is located within the administrative area of City of York Council (CYC), which is responsible for the management of local air quality.

4.1.2 There is currently one AQMA declared within the CYC, as a result of exceedances of the annual mean NO_2 objective: City Centre AQMA (AQMA Order No. 5). The proposed development approximately 2.7km northeast of the AQMA. Due to the distance between the AQMA and the proposed development, traffic generated by the proposed development is likely to disperse through the wider transport network before reaching the AQMA.

4.1.3 There are currently three representative background monitoring locations in the vicinity of the proposed development (REF: B36, B37, and B37a) located approximately 819m southeast. Monitoring data for 2019, provided by CYC, showed monitored annual mean concentrations between 13.9µg/m^3 and 15.4µg/m^3.

4.1.4 There is one NO_2 roadside diffusion tube located within the vicinity of the proposed development (REF: 5). Monitoring data for 2019, provided by CYC, showed monitored annual mean NO_2 concentrations of 16.2µg/m^3 in the vicinity of the proposed development.

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 Although there is a representative background NO_2, monitoring location within the vicinity of the proposed development site, there are no PM_{10} or $PM_{2.5}$ background monitoring locations. Therefore, background concentrations of PM_{10} and $PM_{2.5}$ have been obtained from the 2018-based Defra default concentration maps, for the appropriate grid squares[7].

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

[7] 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				
Pollutant	Annual Mean Concentrations (µg/m^3)			
	NOx	NO_2	PM_{10}	$PM_{2.5}$
2019 Base Year				
ESR 1 – 2 (462500, 454500)	20.78**	14.6**	11.68*	7.47*
ESR 3-4 (461500, 454500)	15.37*	11.51*	12.08*	7.85*
2026 Opening/Future Year				
ESR 1 – 2 (462500, 454500)	17.87**	12.62**	10.84*	6.81*
ESR 3-4 (461500, 454500)	12.41*	9.45*	11.20*	7.18*
*Obtained from the Defra 2018-based background maps **Taken from Diffusion tubes B36, B37 and B37a (Triplicate). Future concentrations have been adjusted using this data and the Defra background maps predictions for 2026.				

4.3 Modelled Baseline Concentrations at Existing Sensitive Receptors

4.3.1 The baseline assessment (i.e. scenarios 1 and 2) has been carried out for the existing sensitive receptors considered, in accordance with Defra guidance (i.e. using EFT v11.0). 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: 2019 Base Year			Scenario 2: 2026 Opening/Future Year, Without Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
ESR 1	17.52	12.24	7.79	14.15	11.40	7.12
ESR 2	18.52	12.43	7.90	14.68	11.59	7.22
ESR 3	15.67	12.85	8.30	11.64	11.97	7.61
ESR 4	16.50	12.91	8.34	12.07	12.02	7.64
NO_2 concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO_2 calculator[8] in accordance with LAQM.TG(22)						

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

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

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 demolition, earthworks, construction and trackout.

5.1.2 Demolition is defined as the removal of an existing structure or structures. The scheme includes the full demolition of the existing structures.

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 and 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 demolition, 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 demolition, 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 demolition, earthworks and construction, there are currently between 10 and 100 receptors (mainly places of work/commercial premises) within 50m 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 places of work/commercial premises) within 50m of where trackout may occur for a distance of up to 200m from the site entrance (assuming construction vehicles travel north along Monks Cross Drive).

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	Medium[a]	Small[b]	Medium[c]	Medium[d]
Step 2B				
Sensitivity of Closest Receptors	Medium	Medium	Medium	Medium
Sensitivity of Area to Dust Soiling Effects	Medium	Medium	Medium	Medium
Sensitivity of Area to Human Health Effects	Low[e]	Low[e]	Low[e]	Low[e]
Step 2C				
Dust Risk: Dust Soiling	Medium Risk	Low Risk	Medium Risk	Medium Risk

Table 8: Construction Phase Dust Assessment for Human Receptors				
	Activity			
	Demolition	Earthworks	Construction	Trackout
Dust Risk: Human Health	Low Risk	Negligible	Low Risk	Low Risk
a. Total building volume estimated to be between 12,000m^2 and 77,000m^2. b. Total site area estimated to be less than 18,000m^2. c. Total building volume estimated to be between 12,000m^3 and 75,000m^3, with potentially dusty construction materials. d. Number of construction phase vehicles estimated to be between 10 and 50 movements per day e. Background annual mean PM_{10} concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid square for 2023.				

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:

- Soft strip inside buildings before demolition;
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed;
- 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 CYC 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 demolition, 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 Human Receptors

5.2.1 The impact assessment has been carried out for the representative existing sensitive receptors considered (i.e. ESR 1 to ESR 4) using EFT v11.0.

5.2.2 Table 9 details the predicted NO_2 concentrations for the 2026 Opening/Future Year, for both the 'Without Development' and 'With Development' scenarios, in accordance with Defra guidance (i.e. using EFT v11.0). 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 – Using the Emission Factor Toolkit v11.0

Receptor	Calculated Annual Mean NO_2 Concentrations ($\mu g/m^3$)[a]				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[b]
		Concentration	Percentage in Relation to AQAL		
ESR 1	11.86	12.29	<75%	<0.5%	Negligible
ESR 2	12.39	12.87	<75%	<0.5%	Negligible
ESR 3	11.64	12.12	<75%	<0.5%	Negligible
ESR 4	12.07	12.58	<75%	1%	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(22)
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

5.2.3 Table 10 details the PM_{10} concentrations for the 2026 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 – Using the Emission Factor Toolkit v11.0					
Receptor	Calculated Annual Mean PM_{10} Concentrations ($\mu g/m^3$)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		
ESR 1	11.40	11.53	<75%	<0.5%	Negligible
ESR 2	11.59	11.74	<75%	<0.5%	Negligible
ESR 3	11.97	12.11	<75%	<0.5%	Negligible
ESR 4	12.02	12.17	<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					

5.2.4 Table 11 details the $PM_{2.5}$ concentrations for the 2026 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 – Using the Emission Factor Toolkit v10.1					
Receptor	Calculated Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[a]
		Concentration	Percentage in Relation to AQAL		
ESR 1	7.12	7.19	<75%	<0.5%	Negligible
ESR 2	7.22	7.30	<75%	<0.5%	Negligible
ESR 3	7.61	7.69	<75%	<0.5%	Negligible
ESR 4	7.64	7.73	<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 The results of the assessment show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, in all scenarios considered, are well below the relevant objectives and limit values.

5.2.6 The CYC 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023) states that an idling management plan may be required for developments that have the potential to cause air pollution as a result of emissions from idling vehicles- such as those proposing a drive-through food retail establishment.

5.2.7 In section 4.3, the development area is modelled as an area source in Scenario 3 (2026 Opening/Future Year, with the proposed development in place). The results found that idling vehicles will cause a 'not significant' effect at sensitive receptors. Therefore, it is considered that an Idling Management Plan is not required for the proposed development.

Assessment of Significance for Human Receptors

5.2.8 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.

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

- Baseline pollutant concentrations in 2019 and 2026 are below the relevant annual mean objectives and limit values at all existing receptors considered;
- 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.

5.2.10 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

5.2.11 The impact of the proposed development is predicted to be not significant for human receptors. The CYC 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023) outlines example mitigation measures that will assist in reducing any potential impact and general best practice measures in relation to air quality are proposed. LIDL GB propose the following mitigation measures:

- Of the 137 car parking spaces, two electric vehicle (EV) spaces will be provided and a further 20% of the standard car parking spaces will be provided with appropriate infrastructure to allow easy conversion to EV spaces in the future;

- The site will benefit from cycle parking in the form of 'Sheffield' cycle stands adjacent to the Lidl food store;
- Pedestrian routes throughout the site will be well lit, signed and marked with crossing facilities to allow significant potential for staff and customers to travel to store by foot; and
- All staff will be provided with sustainable travel information.

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 demolition, 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 four existing sensitive human receptors.

6.2.2 The assessment has been undertaken in accordance with Defra guidance, by using the latest vehicle emission factors from EFT v11.0.

6.2.3 Pollutant concentrations in 2026, with the development in place, are well 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 four existing sensitive receptors considered in 2026. 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 for human receptors. However, in accordance with the CYC 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023), mitigation measures that will assist in reducing any potential impact and general best practice measures in relation to air quality are proposed in section 5.3.5

6.3 Summary

6.3.1 The assessment has demonstrated 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

Appendix A: Air Quality Legislation and Guidance

National Air Quality Strategy

A.1 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[1].

A.2 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.3 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).

A.4 Objectives for each pollutant, except O_3, were first given statutory status in the Air Quality Regulations 2000[2] and Air Quality (Amendment) Regulations 2002[3]. 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.5 EU limit values, set out within the Ambient Air Quality Directive 2008/50/EC[4] (i.e. the CAFE Directive), were transposed into UK legislation on 11th June 2011 as The Air Quality Standards Regulations 2010. These are mostly the same as the air quality objectives in terms of concentrations; however, there are differences in determining how compliance is achieved. Although the UK is no longer part of the EU, no changes

[1] Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. July 2007
[2] The Air Quality Regulations 2000. SI No 928
[3] The Air Quality (Amendment) Regulations 2002
[4] 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

have yet been made to the objectives and limit values used in the management and assessment of air quality.

A.6 Whilst there is no specific objective for $PM_{2.5}$ in England and Wales, a limit value of 20µg/m^3 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. The Environment Act 2021 sets out a requirement to establish a target objective for $PM_{2.5}$, however it is not known what this objective will be or when it will come in to force.

A.7 Examples of where these objectives and limit values apply are detailed in the Defra LAQM Technical Guidance document LAQM.TG(22)[5] 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
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

[5] Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(22), August 2022

Table A1: Examples of Where the Air Quality Objectives Should Apply		
Averaging Period	Objectives Should Apply at:	Objectives Should Generally Not Apply at:
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.8 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.9 LAQM.TG(22) presents a streamlined approach for LAQM in England and Scotland; however, Northern Ireland is still considering changes to LAQM and therefore works according to the previous regime.

A.10 The Welsh Government amended the LAQM regime in Wales in 2017 by issuing new statutory policy guidance in order to bring the system into line with the Well-being of Future Generations (Wales) Act 2015[6]. This aims to achieve compliance with the national air quality objectives in specific hotspots and to reduce exposure to pollution more widely, so as to achieve the greatest public health benefit.

A.11 Local authorities in England are required to produce Annual Status Reports (ASRs), and in Scotland and Wales, 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.12 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 Assessment where a local authority is confident of the outcome. Detailed Assessments should however still be used if there is any doubt.

[6] Well-being of Future Generations (Wales) Act 2015 (anaw 2)

A.13 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.14 The first CAZs were implemented in Bath in March 2021, and in Birmingham in June 2021. In addition, the London Ultra Low Emission Zone (ULEZ) was expanded to incorporate the North and South Circular roads in October 2021. The Bristol CAZ became live in November 2022. The Newcastle-upon-Tyne and Gateshead CAZ became live in January 2023. The Sheffield CAZ became live in February 2023. Charges apply to certain types of vehicles travelling within these areas, including buses, coaches, taxis, private hire vehicles and heavy-duty vehicles (HDVs).

National Planning Policy Framework

A.15 The National Planning Policy Framework (NPPF)[7], introduced in March 2012 and most recently updated in September 2023, 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.16 The Planning Practice Guidance (PPG)[8], updated in November 2019, 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

[7] Ministry of Housing, Communities and Local Government, National Planning Policy Framework, July 2021
[8] Department for Communities and Local Government. Planning Practice Guidance: Air Quality, November 2019

likely to 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.17 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.

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)[9].

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 250m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m 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 250m 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).

[9] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction, August 2023

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 >75,000m^3; Potentially dusty construction material (e.g. concrete); On-site crushing and screening; Demolition activities >12m above ground level	Total building volume 12,000-75,000m^3; Potentially dusty construction material; Demolition activities 6-12m above ground level	Total building volume <12,000m^3; Construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months
Earthworks	Total site area >110,000m^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 >6m in height;	Total site area 18,000-110,000m^2; Moderately dusty soil type (e.g. silt); 5-10 heavy earth moving vehicles active at any one time; Formation of bunds 3-6m in height;	Total site area <18,000m^2; Soil type with large grain size (e.g. sand); <5 heavy earth moving vehicles active at any one time; Formation of bunds <4m in height;
Construction	Total building volume >75,000m^3; On-site concrete batching; Sandblasting	Total building volume 12,000-75,000m^3; Potentially dusty construction material (e.g. concrete); On-site concrete batching	Total building volume <12,000m^3; 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	20-50 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	<20 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
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;	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

Table B2: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects			
Sensitivity Category	Dust Soiling Effects	Health effects of PM_{10}	Ecological Effects
	Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads		

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/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low

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
	28-32µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24µg/m^3	>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/m^3 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/m^3
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.

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	Low 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[10], 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: Supplementary Planning Guidance, 2014

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 5.0.1) 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 Bryan G Hall, the appointed transport consultants for the project. The study extent of the model is shown in Figure C.1.

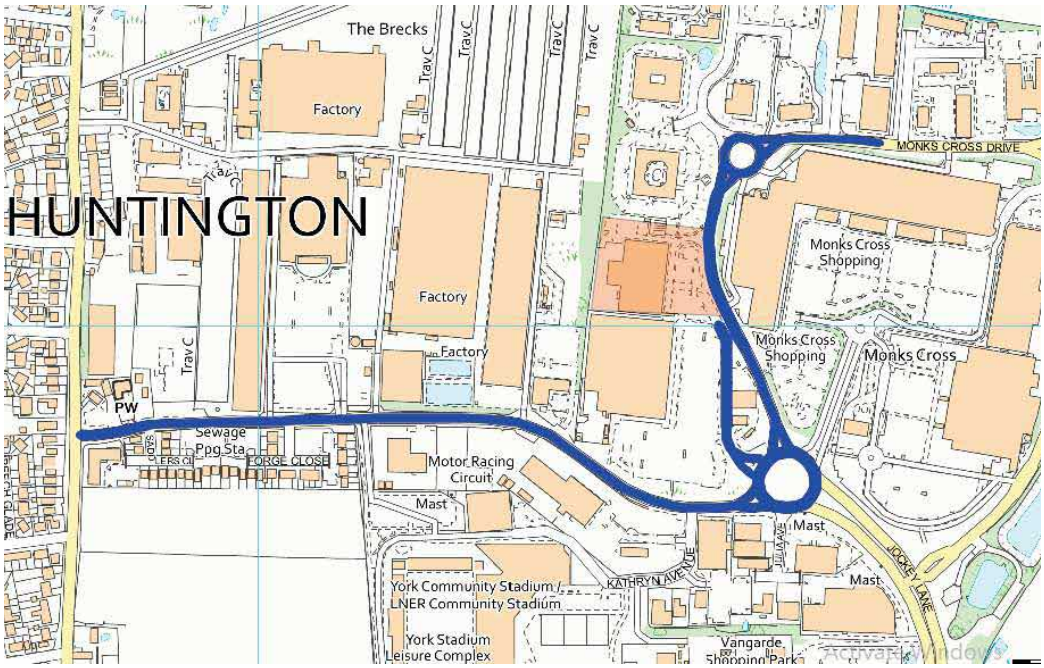


Figure C.1: Study Extent of Air Dispersion Model. The roads modelled in the assessment can be seen in blue and the area source can be seen in red ('Reproduced from Ordnance Survey Maps © Crown Copyright All Rights Reserved Licence No. 0100031673')

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 Background growth rates using Tempro, which accounts for general level of development in the wider area, has been applied.

C.5 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: 2019 Verification and Base Year		Scenario 2: 2026 Without Development		Scenario 3: 2026 Opening/Future Year, With Development	
			LGV	HGV	LGV	HGV	LGV	HGV
1	Jockey Lane (West)	48	13637	157	10934	96	13010	98
2	Monks Cross Drive (North)	48	9219	143	9667	149	10705	149
3	Monks Cross Drive (South)	48	7736	137	8112	143	9149	144
4	Monks Cross Drive	48	7765	120	8142	126	9177	127
5	Sainsburys Car Park	32	10427	91	10934	96	13010	96
6	Area Source- Site Car Park	5	N/A	N/A	N/A	N/A	4152	0

Vehicle Emission Factors

C.6 The air quality assessment has used vehicle emission factors calculated using the Emissions Factor Toolkit (EFT) version 11.0, released in November 2021. This is the most up-to-date version of the EFT currently available.

C.7 As discussed in the section 3.4 of the report, in accordance with the latest guidance from the IAQM, a sensitivity analysis has not been undertaken as model verification has been undertaken using data from later than 2016[11].

C.8 As a result, vehicle emission factors from EFT v11.0 have been used for the assessment, with the appropriate year factors applied to the modelling scenarios.

Car Park Modelling

C.9 The CYC 'Low Emissions Supplementary Planning Guidance' document (most recent version issued June 2023) states that an idling management plan may be required for developments that have the potential to cause air pollution as a result of emissions from idling vehicles- such as those proposing a drive-through food retail establishment.

[11] Available on the Institute of Air Quality Management website (https://iaqm.co.uk/wp-content/uploads/2013/02/iaqm_uncertainty_vehicle_NOx_emission_withdrawn-02.pdf)

C.10 The proposed park and ride car parking area has been modelled in accordance with the guidance note produced by CERC (Note 54: Modelling car parks). To account for emissions from the car park, an area source is included within the model and the emission rate for NOx, PM_{10} and $PM_{2.5}$ is calculated, for both LGVs and HGVs.

C.11 The following formula is used:

The total emission rate from the car park can then be calculated, as follows:

$$\text{Emission rate (g m}^{-2}\text{ s}^{-1}) = \frac{(EF \times D \times M) + (HS \times M/2) + (CS \times M/2)}{60 \times 60 \times 24 \times CP}, \quad \textbf{(Eqn 1)}$$

where:

EF = Emission factor (g/km)
D = Average distance travelled (km)
HS = Hot soak emission factor (g/trip)
CS = Cold start emission factor (g/trip)
M = Vehicle movements (/day)
CP = Car park area (m^2)

Note that not all pollutants are emitted during hot soaks and cold starts therefore Equation 1 will vary for different pollutants.

C.12 The following inputs have been used:

- Number of vehicles (AADT) – 4152 LGVs and 0 HGVs;
- Emission factors (g/km) – taken from the ADMS model for vehicles travelling at 10km/hr. ADMS gives the emission factor per vehicle, this was therefore multiplied by the total number of vehicles per day;
- Emission factors (g/km) – taken from the ADMS model for vehicles travelling at 10km/hr. ADMS gives the emission factor per vehicle, this was therefore multiplied by the total number of vehicles per day. Number of vehicles (AADT) – 4152 LGVs and 0 HGVs;
- Average distance travelled (km) – measured from the entrance of the car park and to the exit;
- Hot soak and cold start emissions (g/trip) – obtained from NAEI emission factors website. As a worst case, the highest emission rate for LGVs was used; and

- Car park area (m^2) – measured to be 9,900 m^2. For robustness, the entire site was modelled as a car park area.

Street Canyons

C.13 LAQM.TG(22) states that 'street canyons can generally be defined as narrow streets where the height of buildings on both sides of the road is greater than the road width'. The principal effects of a street canyon on the dispersion of pollution from a road source are:

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

C.14 The model has not included any street canyons as there are none along the roads included in the study network.

Meteorological Data

C.15 The meteorological data used in the air quality modelling has been obtained from ADM Limited and is from the Linton on Ouse recording station, covering the period between 1st January and 31st December 2019. This has complete data capture for wind and temperature.

C.16 The Linton on Ouse recording station is located approximately 15.1km 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.17 The 2019 wind rose for the Linton on Ouse Meteorological Recording Station is shown in Figure C2.

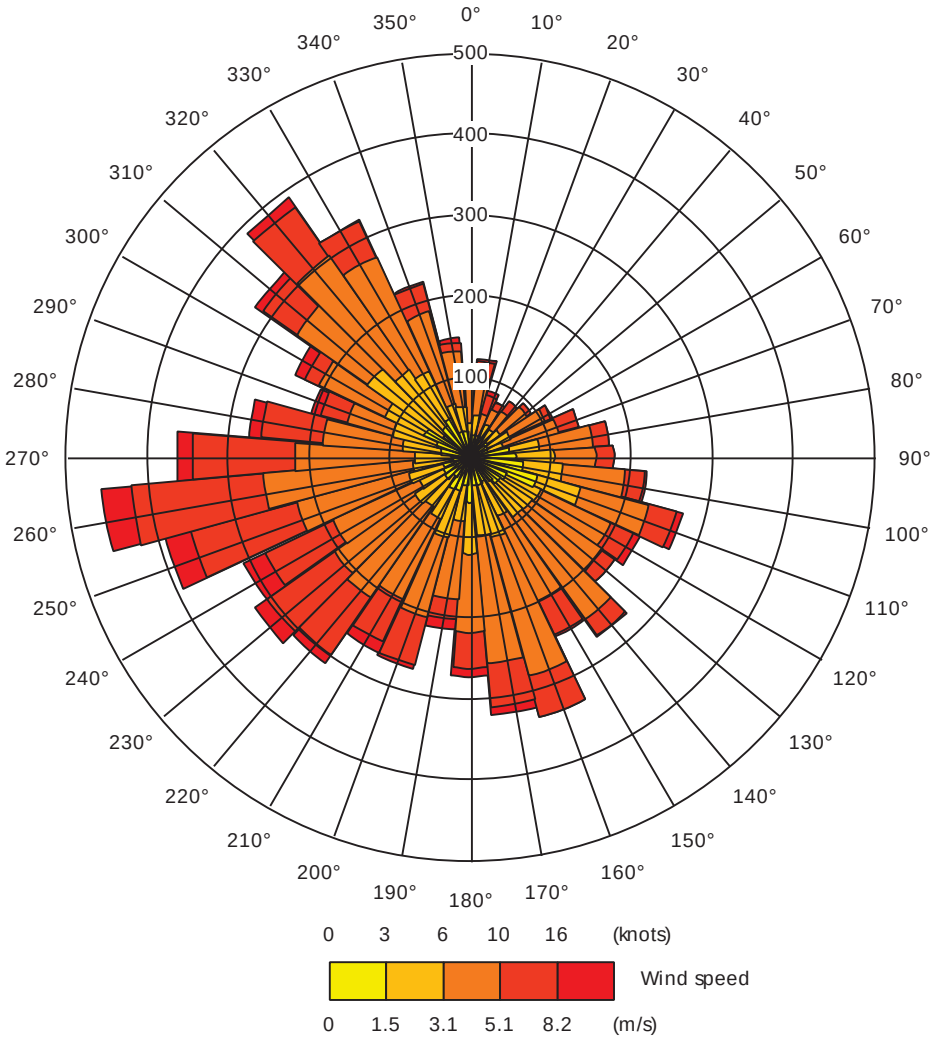


Figure C.2: 2019 Wind Rose for the Linton on Ouse Meteorological Station

Dispersion and Meteorological Site Characteristics

C.18 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.19 In accordance with the guidance within LAQM.TG(22), 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.20 LAQM.TG(22) 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.21 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.22 Following review of the 2023 Annual Status Report (ASR) for City of York Council, it is understood there is one roadside air quality monitoring location in close proximity to the proposed development site (Ref: 5- Lamp post 15 Forge Close, Jockey Lane). Therefore, this diffusion tube has been used to verify the results of the model.

C.23 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.24 The monitoring data that has been used in the model verification procedure is detailed in Table C3.

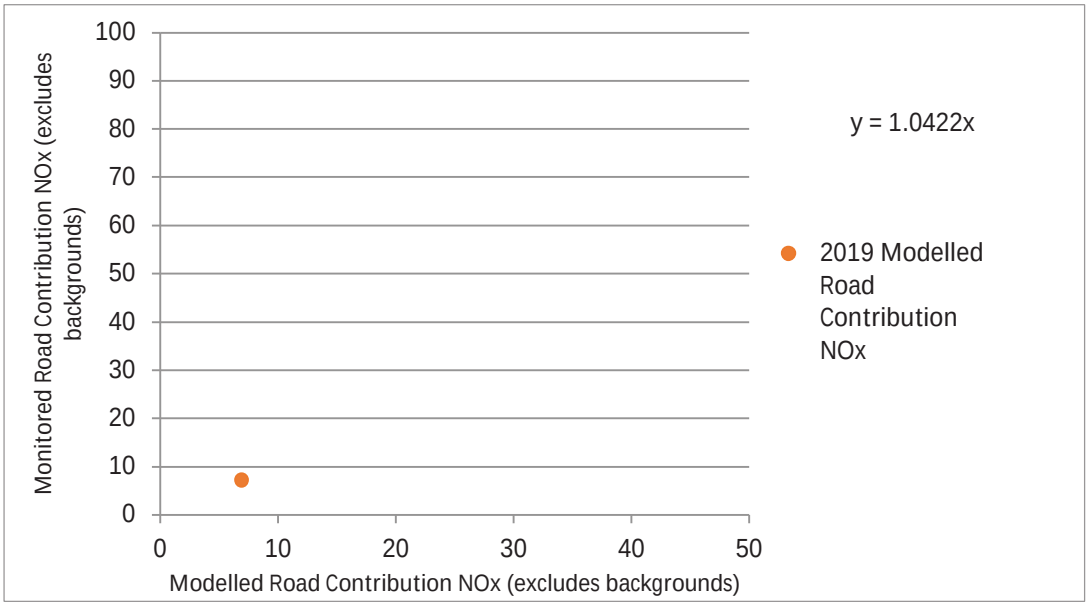
Table C3: NO_2 Monitoring Data Used for Verification Purposes

Monitoring Location Reference	Type	Approximate Grid Reference		2019 Bias Adjusted NO_2 Annual Average Concentration (µg/m^3)
		Easting	Northing	
5	Roadside Diffusion Tube	462040	454883	16.2

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

C.25 The modelled road-contribution NO_x concentration for the diffusion tube has been compared against the measured road-contribution NO_x concentration for the same location. The measured concentrations have been derived using the Defra NO_x to NO_2 calculator, taking into account the background NO_x concentration for the local area.

C.26 The comparison is shown in the below graph. The equation of the trend line is based on linear regression through zero, which provides an overall adjustment factor of 1.0422.



C.27 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.28 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 (%)
5	16.2	16.2	0.00

Assessment Criteria

Assessing the Impact of a Proposed Development on Human Receptors

C.29 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.30 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.31 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
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.32 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.33 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:

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

- 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:

Arlishia Scarpa — Environmental Scientist
BSc (Hons), MSc — (Air Quality)

Arlishia joined Wardell Armstrong in 2023 after completing a BSc in Ecology and Environment at the University of Liverpool and an MSc in Environmental Practice at the Manchester Metropolitan University. Arlishia has experience of carrying out air quality assessments for a variety of developments, including residential and commercial projects. She is involved in all aspects of the assessment, from carrying out air quality monitoring studies to analysing data and writing technical reports. Arlishia has experience in the use of ADMS Roads advanced dispersion model for undertaking detailed air quality modelling.

Paul Threlfall — Principal Environmental Scientist (Air Quality & Odour)
BSc (Hons), 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 also has extensive experience of undertaking detailed air quality assessments for large industrial developments for both planning and permit applications.

Paul has a broad 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 using AERMOD, as well as extensive experience of undertaking 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.

DRAWINGS

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