78 John William Street, Huddersfield

Arbtech

Air Quality Assessment

September 2025

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Executive Summary

Rappor Consultants Limited was appointed by Arbtech to undertake an air quality assessment for the proposed change of use application for 78 John William Street, Huddersfield. The proposed development Site is located within the administrative area of Kirklees Council and lies within the Huddersfield Town Air Quality Management Area.

An application was submitted to Kirklees Council in 2025 for the change of use from offices to residential. An Air Quality Statement was prepared by C49 Architects in relation to the application however, comments from Kirklees Council Environmental Health Department stated that the Statement was not sufficient to evidence that air quality for future residents would be appropriate. An air quality assessment was therefore undertaken by Rappor to consider the exposure of future users to air pollution and determine the suitability of the Site for residential use.

The development proposals will retain the existing structure and minor internal alterations are proposed. A construction phase dust assessment was therefore not undertaken due to the limited works required as part of the proposals.

The proposed development was compared to the IAQM and EPUK guidance screening thresholds for consideration of the impact of the proposed development on local air quality. The proposed development does not include any parking or on-site energy generating plant and therefore, the development did not exceed the Stage One screening thresholds. Where the thresholds are not exceeded, guidance states that the impact of development on local air quality can be considered to have insignificant effects and there is no requirement to carry out an assessment of the impact of the proposed development.

To address Kirklees Council's concerns regarding the suitability of the Site for the proposed sensitive use, a detailed operational phase road traffic emissions assessment was undertaken to predict concentrations of nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$) across the Site. Pollutant concentrations were compared to the current relevant air quality objectives to determine whether mitigation measures are required with regards to air quality. The modelling predicted concentrations to be below the relevant air quality objectives and the Site was therefore considered suitable for the proposed use. No air quality-specific mitigation is therefore required.

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1 Introduction

General

1.1 Rappor Consultants Limited was instructed by Arbtech to undertake an air quality assessment for a proposed change of use application for 78 John William Street in Huddersfield ('the Site'). The proposals are to change the existing office use into 14 residential apartments.

1.2 An application was made to Kirklees Council in 2025 (planning reference: 2025/90548) and an Air Quality Statement was provided by C49 Architecture. Comments were received from Kirklees Council Environmental Health Department stating:

> *"An undated, unreferenced Air Quality Statement by C49 Architecture Limited has been submitted in support of the application. The proposed development is located in Huddersfield Town Centre which has been declared an Air Quality Management Atea (AQMA 9) for exceedances of the annual mean nitrogen dioxide objective. An air quality assessment therefore is required to determine the impact of the proposed development on local air quality during the construction and operational phases, and the likely exposure of on-site sensitive receptors to elevated pollution levels.*
>
> *We have concerns that the document refers to Table 3 and Figure 3 which are not included within the statement. There is also reference to Warwick which clearly is not relevant to Huddersfield town centre. We have concerns that the report author has not considered the low level windows to bedrooms and livings rooms, some of which are below ground floor level on busy town centre streets. The statement includes the wording 'it has been assumed that the operation phase of the development will commence in 2020' this is clearly not the case.*
>
> *For the reasons stated above we do not have full confidence in the Air Quality Statement by C49 Architecture Limited and recommend a pre-determination Air Quality Impact Assessment s submitted for scrutiny. The air quality assessment must identified the level of exposure of future occupants and provide appropriate mitigation measures. If the levels predicted in the report are unacceptable, it may be necessary to refuse the application."*

1.3 This air quality assessment has been prepared in response to Kirklees Council's comments. The assessment considers the potential impacts of the proposed development during both the construction and operational phases. An operational phase road traffic emissions screening assessment was undertaken to consider the impact of development-generated road traffic on local air quality. A detailed operational phase road traffic emissions exposure assessment was undertaken to predict pollutant concentrations across the Site and compared to the relevant air quality objectives to consider the suitability of the Site for the proposed use.

1.4 The assessment takes account of relevant local and national policy and guidance. A glossary of terms utilised in this report is provided in **Appendix A**.

Site Location

1.5 The Site is located on John William Street on the corner of Brook Street and Wood Street in the centre of Huddersfield. The Site is located in the Huddersfield Air Quality Management Area (AQMA) Number 9 which covers the centre of Huddersfield town and was declared by Kirklees Council for exceedances of the annual mean nitrogen dioxide (NO_2) air quality objective. The Site currently hold planning consent for office use and is bound by commercial uses on ground floor level with upper storeys of neighbouring properties used as residential accommodation. Huddersfield train station is located approximately 50m west of the Site at its closest point.

1.6 The Site location is illustrated in **Figure 1.1**.

Figure 1.1 Site Location

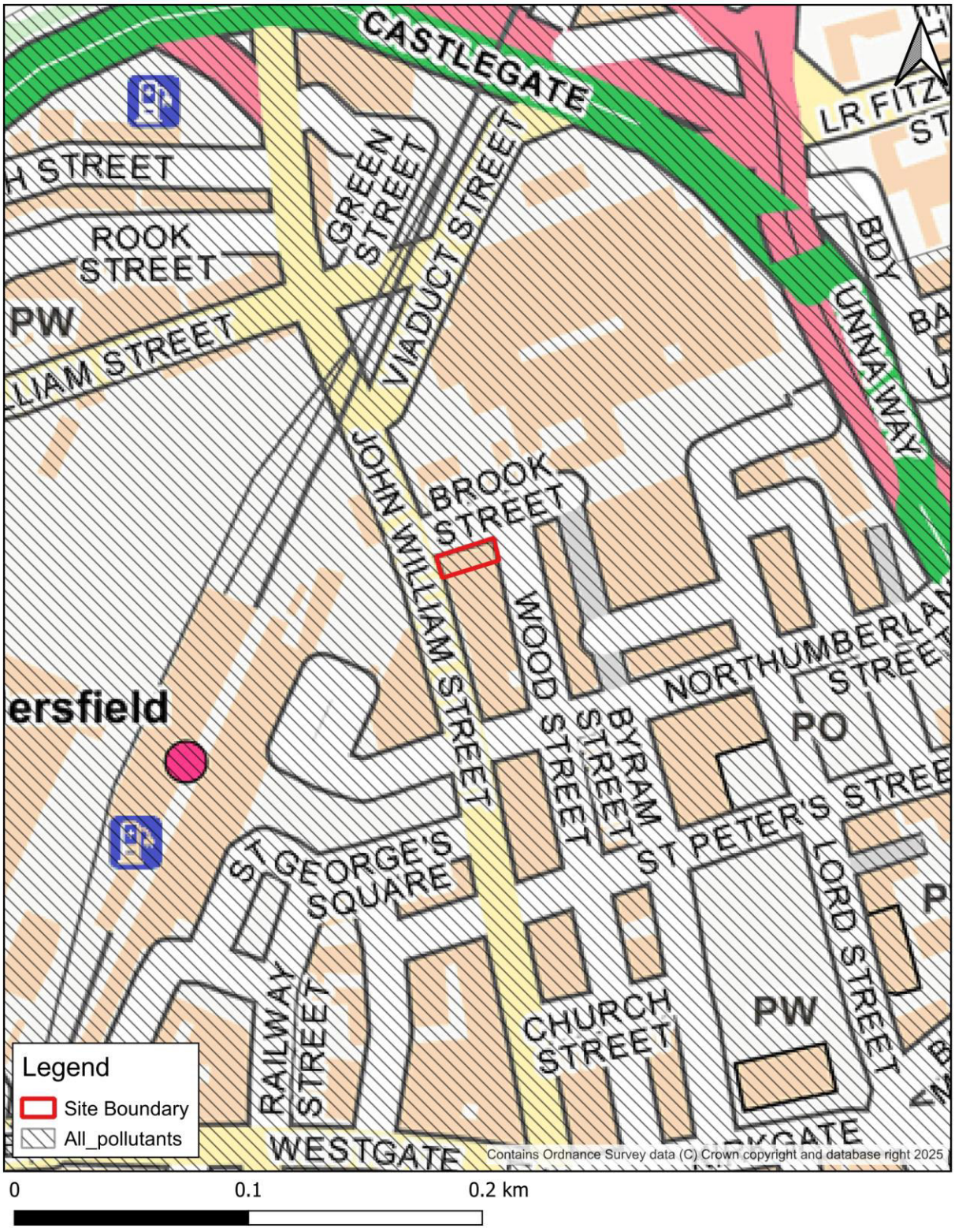


Figure 1.1: Site Location

2 Relevant Policy and Guidance

National Legislation and Planning Policy

2.1 The following national legislation and planning policy is relevant to air quality and was considered throughout this air quality assessment:

- European Parliament, EU 2008 Ambient Air Quality Directive (2008)[1];
- HMSO, Air Quality (England) Regulations (2000)[2];
- HMSO, Environment Act (1995)[3];
- HMSO, Environment Act (2021)[4];
- Department for Environment, Air Quality Strategy (1997)[5];
- Department for the Environment, Food and Rural Affairs (DEFRA), Air Quality Strategy (2007)[6];
- Department for the Environment, Food and Rural Affairs, The Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020)[7];
- HMSO, The Environmental Targets (Fine Particulate Matter) (England) Regulations (2023)[8];
- Department for the Environment, Food and Rural Affairs, Air Quality Strategy: Framework for Local Authority Delivery (2023)[9];
- Department for the Environment, Food and Rural Affairs, Environmental Improvement Plan 2023 (2023)[10];
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework (NPPF) (2025)[11]; and
- Ministry for Housing, Communities and Local Government, Planning Practice Guidance (PPG) for air quality (2019)[12].

Local Planning Policy

2.2 The following local planning policy was reviewed with regards to air quality and a summary of any relevant policies in provided in **Appendix B**:

- Kirklees Council, Kirklees Local Plan Strategy and Policies (2019)[13].

[1] European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe
[2] HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000 (as amended), London: HMSO
[3] HMSO (1995) The Environment Act 1995, London: TSO
[4] HMSO (2021) The Environment Act 2021, London: TSO
[5] Department of the Environment (DoE) (1997) The UK National Air Quality Strategy, London: HMSO
[6] Department of the Environment, Food and Rural Affairs (Defra) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, London: HMSO
[7] Department of the Environment, Food and Rural Affairs (Defra) (2020) The Environment (Miscellaneous Amendments) (EU Exit) Regulations, London: HMSO
[8] HMSO (2023) The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023
[9] Defra (2023) Air Quality Strategy: Framework for Local Authority Delivery
[10] Defra (2023) Environmental Improvement Plan 2023, First revision of the 25 Year Environment Plan
[11] Ministry of Levelling Up, Communities and Local Government (2025) National Planning Policy Framework, HMSO London
[12] Ministry for Housing, Communities and Local Government (2019) Planning Practice Guidance Air Quality
[13] Kirklees Council (2019) Kirklees Local Plan Strategy and Policies

Air Quality Guidance

2.3 The following air quality guidance was utilised in the air quality assessment:

- DEFRA, Local Air Quality Management Technical Guidance (LAQM.TG) 22) (2022)[14];
- Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction (2024)[15]; and
- IAQM and Environmental Protection UK (EPUK), Land-Use Planning and Development Control: Planning for Air Quality (2017)[16].

[14] Defra (2022) Local Air Quality Management Technical Guidance LAQM.TG(22)

[15] Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London

[16] Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality

3 Assessment Methodology

Consultation

3.1 Consultation was undertaken with Environmental Health Department at Kirklees Council detailing the proposed scope of works and assessment methodology to be utilised within the air quality assessment. At the time of writing, no response was received. Details of the consultation with Kirklees Council is provided in **Appendix C**.

3.2 The assessment methodology is detailed below.

Construction Phase - Dust Assessment

3.3 Consideration was given to the potential impact of the proposed development on local air quality during the construction phase in accordance IAQM guidance[15]. The proposals will retain all external walls and windows, and any construction-related activities are isolated to internal works including construction of partition walls to separate larger floor plates. No demolition, earthworks or external construction is proposed.

3.4 Based on the nature of works required as part of the change of use application, it is considered that the proposed works would not give rise to significant dust emissions or particulate matter emissions and therefore, the impact of any construction-related activity on local air quality would be negligible.

3.5 We understand that the contractor appointed to undertake the internal works would be required to adopt appropriate methods to manage potential environmental impacts and with appropriate construction management, the residual impact of the works on local air quality are considered to be negligible. No further consideration of construction phase impacts on local air quality has therefore been undertaken.

Operational Phase Impact Screening Assessment

3.6 IAQM and EPUK guidance[16] provides screening criteria to determine whether a detailed assessment of development-generated road traffic emissions is potentially required. The screening criteria are split into two stages:

Stage One:

3.7 The Stage One criteria detailed below are utilised to determine whether there is the need to proceed to Stage Two of the screening assessment:

- If any of the following apply:
  - a) 10 or more residential units or a Site area greater than 0.5ha; or
  - b) More than 1,000m^2 of floorspace for all other use classes or a Site area of greater than 1ha;
- Coupled with any of the following:
  - a) The development has more than 10 parking spaces; or
  - b) The development will have a centralised energy facility or other centralised combustion process.

Stage Two:

3.8 Where the proposed development exceeds the criteria set out in Stage One, the following indicative criteria are used to determine whether a detailed assessment of development-generated road traffic emissions is required.

3.9 The Stage Two screening criteria are:

- A change in Light Duty Vehicles (LDVs) flows of:
  a) More than 100 Annual Average Daily Traffic (AADT) flow within or adjacent to an Air Quality Management Area (AQMA); or
  b) More than 500 LDVs as an AADT elsewhere.
- A change in Heavy Duty Vehicles (HDVs) of:
  a) More than 25 AADT flow within or adjacent to an AQMA; or
  b) More than 100 AADT flow elsewhere.

3.10 Where none of the Stage Two criteria are exceeded, IAQM and EPUK guidance[16] states:

> *"there should be no requirement to carry out an air quality assessment of the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects".*

Operational Phase Exposure Assessment

Air Dispersion Modelling

3.11 Air dispersion modelling software ADMS-Roads, version 5.1, was utilised to predict concentrations of NOx and particulate matter (PM_{10} and $PM_{2.5}$) across the Site to consider the suitability of the Site for the proposed residential use.

Assessment, Scenarios, Study Area and Sensitive Receptors

3.12 The following assessment scenarios were considered in the assessment:

- Scenario 1: 2023 Model Verification; and
- Scenario 2: 2025 With Development.

3.13 Traffic data were obtained for the above scenarios from the Department for Transport[17] for the study area listed below:

- A62;
- A640;
- A629;
- Brook Street;
- John William Street; and
- Wood Street.

[17] Department for Transport (2025) https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints

3.14 Traffic data used in the assessment are detailed in **Appendix D**.

3.15 Pollutant concentrations were predicted across the Site using a Cartesian grid from co-ordinates X 414353, Y 417062 to X 414534, Y 416929 at a height of 0m. A height of 0m was utilised in the assessment as there are sub-terranean aspects of the building with windows at street level and therefore this grid height enabled consideration of concentrations at the closest point to exhausts.

Dispersion Model Inputs

3.16 A summary of the model inputs utilised in the air dispersion modelling is provided below, with full details provided in **Appendix E**, alongside all relevant assumptions and limitations.

- Emission Factors Toolkit version 13.1[18] was utilised to obtain traffic data emissions for the years of assessment;
- NOx – NO_2 Calculator version 9.1[19] was utilised to convert oxides of nitrogen to NO_2;
- Background concentrations were obtained from the Defra background maps[20] for the years of assessment, in the absence of any representative background monitoring data in the study area;
- Meteorological data from the Emley Moor recording station was utilised in the assessment for the 2023 year, to align with the model verification year. The windrose is presented in **Appendix F**;
- Model verification was undertaken utilising local representative monitoring data from monitoring locations operated by Kirklees Council. Full details of the model verification process are detailed in **Appendix G**.

Assessment Criteria

3.17 Predicted pollutant concentrations were compared to the current relevant air quality objectives detailed in **Table 3.1**.

Table 3.1: Relevant Air Quality Standards and Objectives utilised in the Assessment

Pollutant	Averaging Period	Air Quality Objective (µg.m^{-3})	Date to Achieve by
NO_2	Annual Mean	40	31 December 2005
	1-hour mean not to be exceeded more than 18 times per year	200	31 December 2005
PM_{10}	Annual Mean	40	31 December 2004
	24-hour mean not to be exceeded more than 35 times per year	50	31 December 2004
$PM_{2.5}$	Annual Mean	20	1 January 2020
	Annual Mean	*10*	*31 December 2040*
	*Annual Mean Interim Target**	*12*	*31 January 2028*

*Detailed within the Environmental Improvement Plan 2023.
Italics denotes future air quality objectives that will come into force in the future.

[18] Defra (2025) Emission Factor Toolkit [https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html]
[19] Defra (2024) NOx to NO2 Calculator [https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc]
[20] Defra (2024) background pollutant concentration maps [https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021]

4 Operational Phase Screening Assessment

4.1 The trip generation associated with the proposed development was reviewed and compared to the two stage screening criteria set out in IAQM and EPUK guidance[16].

Stage One

4.2 The development proposals include more than 10 residential dwellings however, it does not include any car parking spaces nor any on-site energy generating plant. In accordance with IAQM and EPUK guidance, where the Stage One thresholds are not exceeded:

> *"If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having an insignificant effect".*

5 Operational Phase Exposure Assessment

5.1 In addition to considering the impact of development-generated road traffic on local air quality at existing sensitive receptors, consideration was given to the suitability of the Site for the proposed sensitive use with regard to the current relevant air quality objectives.

5.2 **Table 5.1** details the highest predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentration within the Site and **Figures 5.1**, **5.2** and **5.3** illustrate annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations across the Site respectively.

Table 5.1: Highest Predicted Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentration across the Site ($\mu g.m^{-3}$)

Annual Mean NO_2	Annual Mean PM_{10}	Annual Mean $PM_{2.5}$
19.2	13.2 (2 days)	7.7

5.3 As detailed in **Table 5.1**, annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ across the Site were below the current relevant annual mean objectives. With regard to the hourly mean NO_2 objective, as the highest predicted annual mean NO_2 concentration was significantly less than $60\mu g.m^{-3}$, in accordance with Defra guidance, exceedances of the hourly mean NO_2 objective are unlikely. With regard to the daily mean PM_{10} objective, the greatest number of days predicted to experience PM_{10} concentrations above $50\mu g.m^{-3}$ was four, which is well below the 35 days set out in the objective.

5.4 With regard to the interim and future $PM_{2.5}$ objectives set to come into force in January 2028 and 2040 respectively, the predicted $PM_{2.5}$ concentrations at the Site in 2025 were below both objectives. It can therefore be considered that the Site will also be compliant with the interim and future $PM_{2.5}$ objectives in the years when they are applicable.

5.5 It is therefore considered that the Site is suitable for the proposed use with regards to the current relevant air quality objectives.

Consideration of Rail Emissions

5.6 The Site is located approximately 50m from Huddersfield Train Station. The Manchester Victoria to Leeds railway line which travels through this station is identified by Defra as a heavy-diesel usage line. Whilst it is a heavy-diesel usage line, the Site is not located within 30m of the station or sidings where locomotives will be present for periods of 15 minutes or more, nor within 15m of tracks where moving trains will be present. In accordance with Defra guidance, where the above criteria are not met, the influence of rail emissions on the Site can be considered insignificant. It is therefore concluded that rail emissions will not significantly influence air quality at the Site.

Figure 5.1: Annual Mean NO_2 Concentrations across the Site

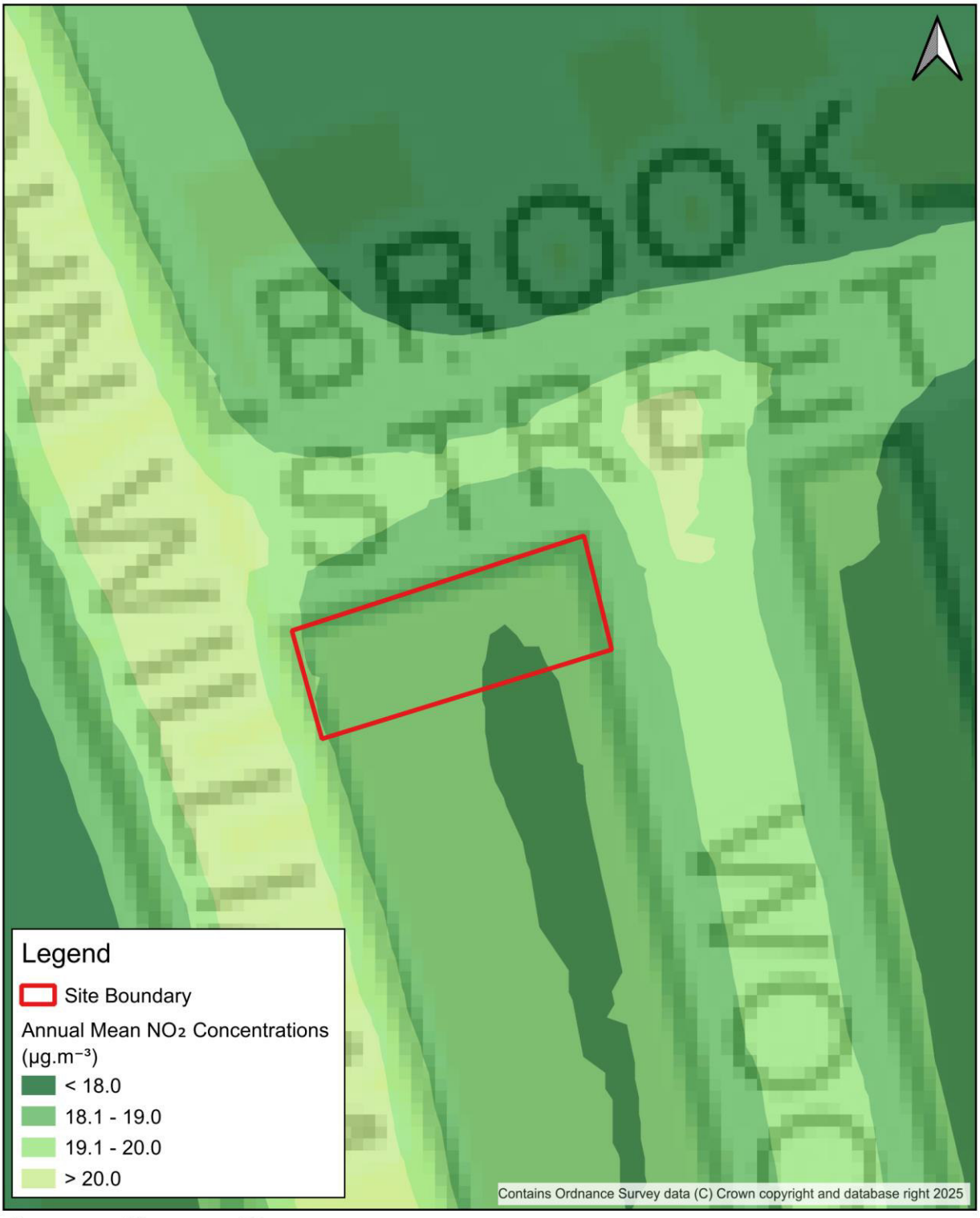


Figure 5.1: Annual Mean NO_2 Concentrations at the Site

Figure 5.2: Annual Mean PM_{10} Concentrations across the Site

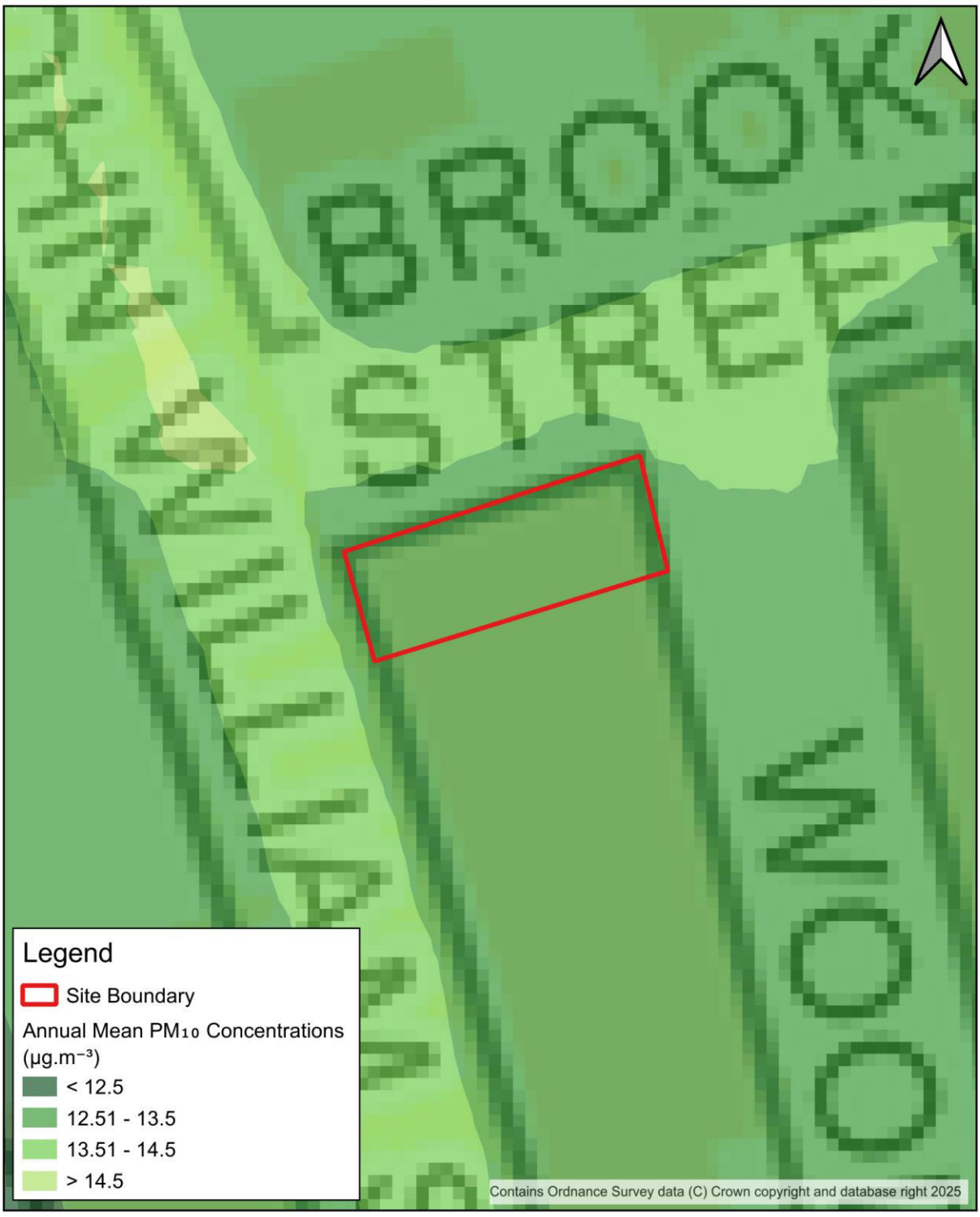


Figure 5.2: Annual Mean PM_{10} Concentrations at the Site

Figure 5.3: Annual Mean $PM_{2.5}$ Concentrations across the Site

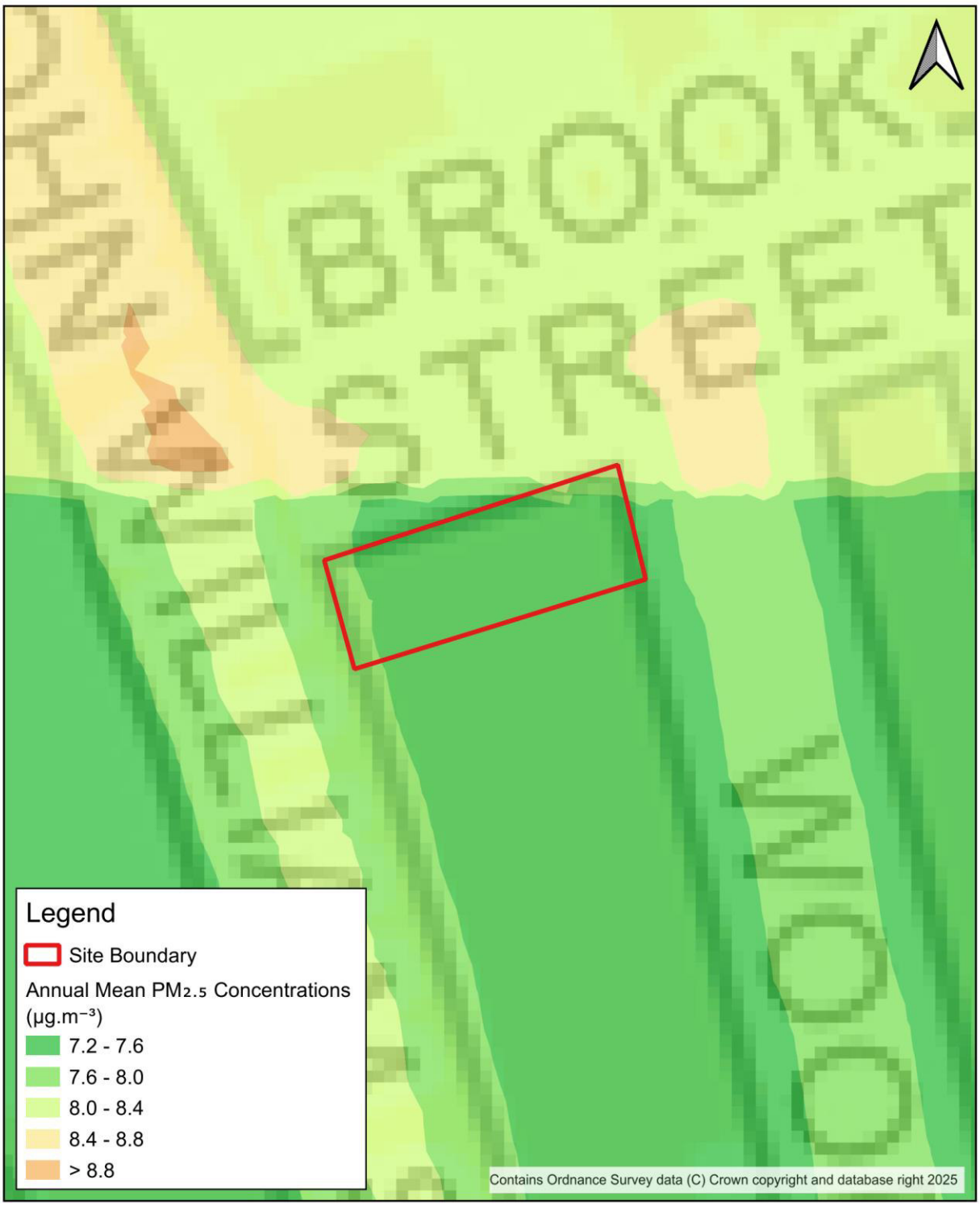


Figure 5.3: Annual Mean $PM_{2.5}$ Concentrations at the Site

6 Summary and Conclusions

6.1 Rappor was instructed by Arbtech to undertake an air quality assessment for submission with a planning application for the change of use from office to residential at 78 John William Street in Huddersfield.

6.2 The proposals do not involve any external demolition, earthworks or construction works and all works will be limited to minor internal alterations, with all walls and windows retained. Due to the small scale of activity required as part of the proposed change of use, it is considered that the proposals will not give rise to any significant impacts as a result of dust soiling or human health effects associated with the construction phase. This was not considered further in the assessment.

6.3 A qualitative operational phase road traffic emissions screening assessment was undertaken to consider the impact of the proposed development on local air quality. The two stage screening criteria set out in guidance were not exceeded and there was no need to undertake any further detailed assessment of the impact of development-generated road traffic. Where the two stage screening criteria are not exceeded, the proposed development can be considered as having a not significant impact on local air quality as a result of development-generated traffic.

6.4 A detailed operational phase road traffic emissions impact assessment was undertaken to predict pollutant concentrations across the Site to determine the suitability of the Site for the proposed residential use. Concentrations of NO_2, PM_{10} and $PM_{2.5}$ were predicted to be well below current relevant air quality objectives. Additionally, $PM_{2.5}$ concentrations were predicted to be below both 2028 interim and 20240 future $PM_{2.5}$ objectives. It was therefore identified that the Site is suitable for residential use, and no mitigation measures are required with regards to air quality.

Appendix A – Glossary

Term	Definition
AADT	Annual Average Daily Traffic flow.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between two years, which is useful for pollutants that have higher concentrations during the winter months.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	Air Quality Strategy.
Defra	Department for Environment, Food and Rural Affairs.
EPUK	Environmental Protection UK.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
HDV	Heavy Duty Vehicles (HGVs + buses and coaches)
HGV	Heavy Goods Vehicles.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
LDV	Light Duty Vehicles (motorbikes, cars, vans and small trucks)
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NOx	Nitrogen oxides.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
micrograms per cubic metre ($\mu g.m^{-3}$)	A measure of concentration in terms of mass per unit volume. A concentration of 1μg.m-3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

Appendix B – Local Planning Policy

Kirklees Local Pan Strategy and Policies 2019

The Kirklees Local Plan contains the following policies relevant to air quality:

> *"Policy LP15 Residential use in town centres*
>
> *Proposals for residential uses (including student accommodation) within the defined town centres as set out on the Policies Map will be supported subject to:*
>
> *[…]*
>
> *d. the protection of amenity of existing residents and future occupiers of the proposed residential use in accordance with amenity and design policies within the plan, and will in particular consider matters such as privacy, noise and air quality;*
>
> *[…]*
>
> *Policy LP47 Healthy, active and safe lifestyles*
>
> *The council will, with its partners, create an environment which supports healthy, active and safe communities and reduces inequality.*
>
> *Health, active and safe lifestyles will be enabled by:*
>
> *[…]*
>
> *g. ensuring that the current air quality in the district Is monitoring and maintained and, where required, appropriate mitigation measures included as part of new development proposals;*
>
> *[…]*
>
> *LP51 Protection and improvement of local air quality*
>
> *1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people.*
>
> *2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted.*
>
> *3. Where the development introduces new receptors into an AQMA or areas of concern, or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable measures that protect the new receptors from unacceptable level of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted."*

Appendix C – Consultation

Freya Hoyle

From: Freya Hoyle
Sent: 10 September 2025 10:12
To: air.quality@kirklees.gov.uk
Subject: 78 John William Street - air quality assessment
Attachments: 2025-90548_+Consultee+Responses_1095372.PDF

Good morning,

Rappor has been instructed to undertake an air quality assessment for the proposed redevelopment of 78 John William Street in Huddersfield. An application for the change of use from offices to apartments was submitted in 2025 (reference 2025/90548) and a response from received from the Environmental Health department. The response identified that the Air Quality Statement prepared by C49 Architecture was not sufficient to provide confidence that the site was suitable for the proposed sensitive use due to its location in the Huddersfield AQMA.

Rappor has been instructed to undertake a detailed assessment of site suitability to consider the exposure of future residents to elevated pollutant concentrations, and determine any requirement for mitigation.

Our proposed assessment methodology is provided below for your consideration and we would be grateful if you could advise if this is accepted.

Construction:
Whilst some internal alterations are proposed to split up larger floor plates into smaller apartment areas, no external works are required. As all works will be undertaken within the building envelope, it is considered that the proposed works will not represent a significant source of dust or emissions that may materially impact local air quality during the construction phase. No assessment of construction phase dust is therefore proposed.

Operation:
A detailed operational phase site suitability assessment will be undertaken using the latest version of ADMS-Roads dispersion modelling software. Concentrations of NO2, PM10 and PM2.5 will be predicted across the site at various floor levels and compared to the current relevant air quality objectives, as well as the interim and future PM2.5 objectives to determine the suitability of the site for residential use.

The latest version of Defra air dispersion modelling tools, including EFT and NOx-NO2 Calculator, will be used in the assessment. Meteorological data from the Emley Moor station will be used as the closest recording station to the site.

Model verification will be undertaken using Kirklees Council monitoring for 2023.

If you have any queries or wish to discuss anything, please do let me know.

Best regards,

Freya

Freya Hoyle MSc BSc MIAQM MIEnvSc
Technical Director – Air Quality
Advanced notice of annual leave 17th September – 29th September 2025
m 07425 083557

Appendix D – Traffic Data

Table D1: Traffic Data used in Air Dispersion Modelling

Road	2023 Verification Year		2025 With Development	
	AADT	HDV	AADT	HDV
A62 Leeds Road	26150	1015	26412	1025
A62 Castlegate	16099	279	16260	282
A62 Castlegate	27698	706	27975	713
John William Street	4551	48	4597	48
Brook Street	910	10	919	10
Wood Street	2276	24	2298	24
A62 Castlegate	27392	853	27666	862
A640 Trinity Street	11500	388	11615	392
A62 Southgate	31457	1396	31772	1410
A62 Queensgate	25805	907	26063	916
A629 Wakefield Road	33858	1112	34197	1123

Appendix E – Dispersion Model Inputs

The following inputs were utilised in the atmospheric dispersion modelling undertaken as part of the air quality assessment:

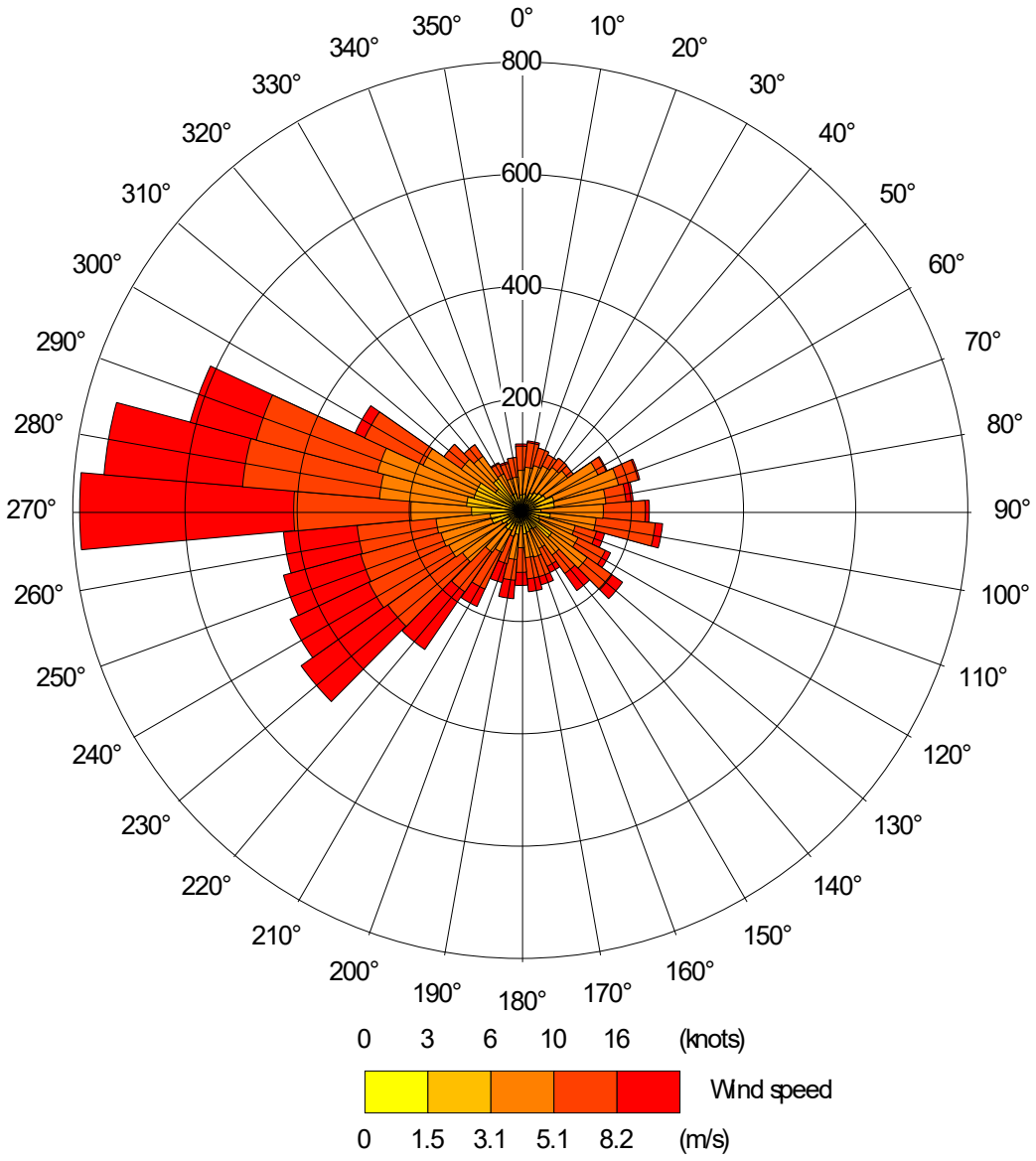
- The atmospheric dispersion modelling software AMDS-Roads version 5.1 was utilised in the assessment;
- Emission Factor Toolkit version 13.1 was utilised to obtain emission factors for the years of assessment (2023 and 2025);
- NOx-NO_2 Calculator version 9.1 was utilised to derive NO_2 concentrations from modelled Road NOx concentrations. The input parameter 'All other urban UK roads' was utilised to represent the roads included in the study area, which is located in an urban setting and does not include roads within London, or any motorways;
- Meteorological data from the Emley Moor recording station was utilised in the air dispersion model for the verification year of 2023. A surface roughness of 0.75m and a Monin-Obhukov length of 30m were utilised for the Site to represent the location in a large town centre with a mix of urban and industrial uses;
- Following the withdrawal of the IAQM position statement regarding sensitivity analyses, no sensitivity analysis scenario was included within the assessment.

The following limitations and assumptions are applicable to the air quality assessment:

- There are uncertainties associated with both measured and predicted concentrations. The model relies on input data (including projected traffic flows), which also have uncertainties associated with them. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS Roads model will not take into account.
- To reduce the uncertainty associated with predicted concentrations, model verification has been carried out following guidance set out in LAQM.TG(22)v2, which recommends the use of roadside monitoring for this process. As the model has been verified against 2023 measured concentrations and has been adjusted to take account of the apparent under-prediction, there can be reasonable confidence in the predicted concentrations.

Appendix F – Wind Rose

The 2023 wind rose for the Emley Moor meteorological recording station is illustrated below. The prevailing wind direction is from the west



Appendix G – Model Verification

Whilst ADMS Roads is widely validated for use in this type of assessment, model verification for the area around the Site will not have been included. To determine model performance at a local level, a comparison of modelled results with monitored results in the study area was done in line with methodology specific in LAQM.TG(22)v2. This process of verification aims to minimise modelling uncertainty by correcting modelled results by an adjustment factor to give greater confidence to the results.

The model was run to predict the 2023 annual mean road-NOx contribution at the Kirklees Council-operated monitoring locations. The model outputs of road-NOx were compared to the 2023 'measured' road-NOx, which was determined from the nitrogen dioxide concentrations measured at the monitoring locations, utilising the NOx from NO_2 calculator provided by Defra and the NO_2 background concentration.

Table G1 details the model verification process.

Table G1: Model Verification Process (µg.m^{-3})

Verification Step	K11	K21	K28	K58
2023 monitored NO_2	27.9	35.7	38.1	32.5
2023 background NO_2	16.1	16.1	16.1	16.2
Monitored road NOx	28.0	50.2	57.7	40.3
Modelled road NOx	13.3	16.0	16.4	12.9
Ratio between monitored and modelled road NOx	2.1	3.1	3.5	3.1
Adjustment factor	3.0418			
Adjusted modelled road NOx	40.5	48.7	49.9	39.2
Modelled total NO_2	32.4	35.2	35.6	32.1
% difference	16.3	-1.3	-6.5	-1.1
% RMSE	6.5			

A road-NOx adjustment factor of 3.0418 was determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor was then applied to the modelled road-NOx concentration at each receptor, before conversion to NO_2 concentrations using the NOx to NO_2 calculator provided by Defra, and the NO_2 background concentration.

The RMSE% is less than 10% and therefore leis within the Defra guidance ideal range; there can therefore be statistical confidence in the results of the assessment.

As there are no PM_{10} or $PM_{2.5}$ monitoring locations within the study area, the predicted road-PM_{10} and road-$PM_{2.5}$ components have been adjusted using the road-NOx factor before adding the appropriate background concentration.

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