Air Quality Assessment

City Road East, Manchester

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Executive Summary

Redmore Environmental Ltd was commissioned by Car Park Securities to undertake an Air Quality Assessment in support of a retrospective planning application for a temporary car park on land off City Road East, Manchester.

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development; and,
- Identify any requirement for relevant mitigation measures.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development. Dispersion modelling was therefore undertaken to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that air quality impacts as a result of traffic generated by the development were not predicted to be significant at any sensitive location in the vicinity of the site.

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

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1.0 INTRODUCTION

1.1 Instruction

1.1.1 Redmore Environmental Ltd was commissioned by Car Park Securities to undertake an Air Quality Assessment in support of a retrospective planning application for a temporary car park on land off City Road East, Manchester.

1.2 Site Location and Context

1.2.1 The proposed development is located on land off City Road East, Manchester, at approximate National Grid Reference (NGR): 383605, 397345. The relevant Local Authority (LA) is Manchester City Council (MCC). Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 A retrospective planning application will be submitted in support of a temporary car park on land off City Road East, Manchester. The site previously provided office space. Demolition of the office buildings was completed in June 2024. The space has now been operating as a temporary car park since May 2025 and proposes to be operational until September 2026.

1.3 Assessment Scope

1.3.1 The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:

- Assess potential impacts associated with road transport emissions during the operational phase of the development; and,
- Identify any requirement for relevant mitigation measures.

1.3.2 This is detailed in the following report.

1.4 Report Updates

1.4.1 An Air Quality Assessment was submitted previously submitted in support of the proposals. Comments were subsequently received from MCC requesting provision of detailed

dispersion modelling to consider the potential for air quality impacts associated with road transport emissions during the operational phase of the development. This is provided in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2025[2] was published in December 2025, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The Concentration Target for 2040 was adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

[1] AQS: Framework for Local Authority Delivery, DEFRA, 2023.

[2] Environmental Improvement Plan 2023, DEFRA, 2025.

2.1.5 Table 1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target/Concentration Target

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	10(a)	Annual mean
	10(b)	Annual mean

Note: (a) Interim Target to be achieved by 2030.
(b) Concentration Target to be achieved by 2040.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance[3] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

[3] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Local Air Quality Management

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

2.3 National Planning Policy

2.3.1 The revised National Planning Policy Framework[4] (NPPF) was published in December 2024 and amended in February 2025. The document sets out the Government's planning policies for England and how these are expected to be applied.

[4] NPPF, Ministry of Housing, Communities and Local Government, 2024.

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

> "c) an environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

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

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]."

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

> "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should

ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

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

2.4 National Planning Practice Guidance

2.4.1 The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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

2.5 Regional Planning Policy

2.5.1 The Places for Everyone Plan (PfEP)[6] was produced by the nine Greater Manchester Combined Authorities (GMCAs) of Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, and became part of the statutory development plan for each of the Councils on 21st March 2024.

2.5.2 A review of the PfEP indicated the following policies of relevance to air quality that have been considered throughout this assessment:

[5] https://www.gov.uk/guidance/air-quality--3.

[6] PfEP, GMCA, 2024.

"Policy JP:S5: Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;
2. Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;
3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;
4. Restricting developments that would generate significant point source pollution such as some types of industrial activity and energy generation;
5. Significantly expanding the existing commercial network of electric vehicle charging points, both for public and private use, including as part of new developments;
6. Implementing the Clean Air Plan and associated measures;
7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;
8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;
9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;
10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and,

11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."

"Policy JP-P1 Sustainable Places

We aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

[…]

15. Comfortable and inviting, with indoor and outdoor environments:

A. Offering a high level of amenity that minimises exposure to pollution; and,

[…]."

2.5.3 The above policies were taken into consideration throughout the undertaking of the assessment.

2.6 Local Planning Policy

2.6.1 The Manchester Local Plan consists of a series of planning documents of which the Core Strategy Development Plan Document (DPD)[7] is central. This was adopted by MCC on 11th July 2012.

2.6.2 Review of the Core Strategy DPD indicated the following policies of relevance to the assessment:

"Policy EN 16 Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic

[7] Core Strategy DPD, MCC, 2012.

routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local effect of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the effects on air quality, alongside other plan objectives. This includes cumulative effects, particularly in Air Quality Management Areas."

"Policy DM 1 Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

[…]

Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise."

2.6.3 It should be noted that MCC issued an addendum to the Core Strategy in 2024[8]. This confirms that the remaining text of Policy EN16 has been superseded by PfE Policy JP-S5, as referenced in Section 2.6.

2.6.4 MCC has also produced the 'Air Quality & Planning Technical Guidance' Document'[9] which provides guidance on assessing the impact of proposed development on air quality.

2.6.5 The above policies and guidance were taken into consideration throughout the undertaking of the assessment.

8 Addendum to Manchester Core Strategy, MCC, 2024.

9 Air Quality & Planning Technical Guidance, MCC, 2022.

2.7 Greater Manchester Clean Air Plan

The UK Government has instructed a number of LAs to take rapid action to reduce harmful roadside levels of NO_2 within their areas of jurisdiction in the quickest possible timeframe. The GMCA and Transport for Greater Manchester (TfGM) have collaborated to develop a Clean Air Plan (CAP) to ensure Greater Manchester achieves compliance with the relevant AQOs for NO_2 by 2026 at the latest. The initial CAP proposal included implementation of a Class C charging Clean Air Zone. The GMCA has subsequently updated the CAP proposals[10] to comprise an investment-led, non-charging approach. This was approved by the UK Government on 23rd January 2025. The implications of the CAP were taken into account during the undertaking of this assessment.

10 Case for a New GM Clean Air Plan, GMCA and TfGM, 2022.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the operational phase. These have been assessed in accordance with the following methodology.

3.2 Assessment

3.2.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have therefore been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2024 - Verification;
- Future year Do-Minimum (DM) (predicted traffic flows in 2026 should the proposals not proceed); and,
- Future year Do-Something (DS) (predicted traffic flows in 2026 should the proposals be granted permission).

3.2.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

3.2.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided by National Highways[11] on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance[12] on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

[11] LA 105: Air Quality, National Highways, 2024.

[12] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

3.2.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[13]. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 3.

Table 3 Significance of Operational Phase Road Vehicle Exhaust Emissions Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/Concentration Target (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/Concentration Target	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/Concentration Target	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/Concentration Target	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/Concentration Target	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/Concentration Target	Moderate	Substantial	Substantial	Substantial

3.2.5 The matrix shown in Table 3 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.2.6 Following the prediction of impacts at discrete receptor locations, the IAQM document[14] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

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

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

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

3.2.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

4.0 BASELINE

4.1 Introduction

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

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), MCC has undertaken Review and Assessment of air quality within its area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within the city. As such, a number of roads within Manchester have been included within the GMCA AQMA. This is described as follows:

> "This is the part of the Greater Manchester Combined Authority AQMA located within the Manchester City Council area."

4.2.2 The development is located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.2.3 MCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant levels is undertaken by MCC throughout its area of jurisdiction. Data has also been collected by the GMCA to inform the CAP. Recent NO_2 concentrations recorded in the vicinity of the development, as provided in GMCA's '2024

Air Quality Annual Status Report (ASR)'[15] and 'CAP NO_2 Diffusion Tube Results 2011-2024'[16], are shown in Table 4. Exceedences of the relevant AQO are shown in **bold**.

Table 4 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)			
		2021	2022	2023	2024
CAP_MANC_041	A57 (M) (Mancunian Way)	**41.1**	**40.4**	39.3	35.9
CAP_MANC_042	A57 (M) (Mancunian Way)	39.2	38.8	36.7	32.5
CAP_MANC_043	A57 (M) (Mancunian Way)(a)	33.2	35.7	-	-
CAP_MANC_044	A57 (M) (Mancunian Way)(a)	52.2	33.6	-	-
CAP_MANC_045	A57 (M) (Mancunian Way)	**56.4**	**64.7**	**50.4**	**50.6**
CAP_MANC_155	A5103 Medlock St(a)(b)	-	33.5	-	-
CAP_MANC_156	A5103 Medlock St(a)(b)	-	35.7	-	-

(a) Monitor decommissioned in 2023.

(b) Monitor commissioned in 2022.

4.3.2 As shown in Table 4, annual mean NO_2 concentrations were above the AQO of 40µg/m³ at CAP_MANC_041 in 2021 and 2022, and at CAP_MANC_045 from 2021 to 2024. As these monitors are at roadside positions within an AQMA, elevated results would be expected. Concentrations were below the AQO of 40µg/m³ at all remaining survey sites in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations during 2021 were affected by changes to travel patterns associated with the COVID-19 pandemic. The results should therefore be viewed with caution. However, data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM[17], who have adopted the following position:

> "ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

15 2024 Air Quality ASR, GMCA, 2025.

16 Greater Manchester LAQM and CAP NO_2 Diffusion Tube Results 2011-2024, GMCA, 2024.

17 Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

4.3.4 MCC do not undertake monitoring of PM_{10} or $PM_{2.5}$ concentrations within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 383500, 397500. Data for this location was downloaded from the DEFRA website[18] for the purpose of the assessment and is summarised in Table 5.

Table 5 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)	
	2024	2026
NO_2	20.43	18.94
PM_{10}	14.30	14.21
$PM_{2.5}$	8.03	7.92

4.4.2 As shown in Table 5, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and Concentration Target at the development site.

4.5 Sensitive Receptors

4.5.1 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 6.

Table 6 Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - City Road East, Manchester	383589.3	397373.3
R2	Residential - City Road East, Manchester	383557.8	397313.6

[18] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2023.

Receptor		NGR (m)	
		X	Y
R3	Residential - City Road East, Manchester	383565.5	397290.0
R4	Residential - City Road East, Manchester	383555.1	397307.9
R5	Residential - City Road East, Manchester	383498.1	397249.5
R6	Residential - City Road East, Manchester	383508.1	397232.1
R7	Residential - City Road East, Manchester	383365.2	397202.6
R8	Residential - City Road East, Manchester	383517.7	397266.3

4.5.2 Reference should be made to Figure 3 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 ASSESSMENT

5.1 Introduction

5.1.1 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

5.1.2 The assessment considered the following scenarios:

- 2024 - Verification;
- 2026 - DM; and,
- 2026 - DS.

5.1.3 The DM scenario (i.e. without development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year. The DS scenario (i.e. with development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

5.1.4 For the purpose of the assessment, traffic data for 2026 was utilised as the development future year scenario. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2024 were utilised within the dispersion model. The use of 2026 traffic data and 2024 emission factors is considered to provide a conservative scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

5.1.5 Reference should be made to Appendix 1 for full assessment input details.

5.2 Potential Development Impacts

Predicted Concentrations

5.2.1 Annual mean NO_2 concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 7.

Table 7 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - City Road East, Manchester	28.57	28.65	0.08
R2	Residential - City Road East, Manchester	27.00	27.05	0.05
R3	Residential - City Road East, Manchester	26.13	26.17	0.04
R4	Residential - City Road East, Manchester	27.08	27.14	0.06
R5	Residential - City Road East, Manchester	32.01	32.11	0.10
R6	Residential - City Road East, Manchester	36.02	36.16	0.14
R7	Residential - City Road East, Manchester	34.50	34.56	0.06
R8	Residential - City Road East, Manchester	31.57	31.68	0.11

5.2.2 As indicated in Table 7, predicted annual mean NO_2 concentrations were below the AQO of 40$\mu g/m^3$ at all receptor locations in both scenarios.

5.2.3 Reference should be made to Figures 4 and 5 for graphical representations of annual mean NO_2 concentrations across the assessment area for the DM and DS scenarios, respectively.

5.2.4 Annual mean PM_{10} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 8.

Table 8 Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - City Road East, Manchester	17.11	17.14	0.03
R2	Residential - City Road East, Manchester	16.66	16.68	0.02
R3	Residential - City Road East, Manchester	16.36	16.37	0.01
R4	Residential - City Road East, Manchester	16.70	16.72	0.02
R5	Residential - City Road East, Manchester	18.67	18.72	0.04
R6	Residential - City Road East, Manchester	20.40	20.47	0.06
R7	Residential - City Road East, Manchester	19.92	19.95	0.03
R8	Residential - City Road East, Manchester	18.47	18.51	0.04

5.2.5 As indicated in Table 8, predicted annual mean PM_{10} concentrations were below the AQO of $40\mu g/m^3$ at all receptor locations in both scenarios.

5.2.6 Reference should be made to Figures 6 and 7 for graphical representations of annual mean PM_{10} concentrations across the assessment area for the DM and DS scenarios, respectively.

5.2.7 Annual mean $PM_{2.5}$ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 9.

Table 9 Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - City Road East, Manchester	9.54	9.55	0.02
R2	Residential - City Road East, Manchester	9.29	9.30	0.01
R3	Residential - City Road East, Manchester	9.13	9.14	0.01
R4	Residential - City Road East, Manchester	9.31	9.32	0.01
R5	Residential - City Road East, Manchester	10.37	10.39	0.02

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)		
		DM	DS	Change
R6	Residential - City Road East, Manchester	11.29	11.32	0.03
R7	Residential - City Road East, Manchester	11.03	11.05	0.01
R8	Residential - City Road East, Manchester	10.26	10.28	0.02

5.2.8 As indicated in Table 9, predicted annual mean $PM_{2.5}$ concentrations were above the Concentration Target of 10µg/m³ at four receptors and below the Concentration Target at four locations in both the DM and DS scenarios. It should be noted that there were no new exceedences in the DS scenario when compared to the DM.

5.2.9 Reference should be made to Figures 8 and 9 for graphical representations of annual mean $PM_{2.5}$ concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.2.10 Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 10.

Table 10 Predicted Impacts - NO_2

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R2	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R3	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R4	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R5	Residential - City Road East, Manchester	76 - 94% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R6	Residential - City Road East, Manchester	76 - 94% of AQO	0	Negligible
R7	Residential - City Road East, Manchester	76 - 94% of AQO	0	Negligible
R8	Residential - City Road East, Manchester	76 - 94% of AQO	0	Negligible

5.2.11 As indicated in Table 10, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.2.12 Predicted impacts on annual mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 11.

Table 11 Predicted Impacts - PM_{10}

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R2	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R3	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R4	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R5	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R6	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R7	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible
R8	Residential - City Road East, Manchester	Below 75% of AQO	0	Negligible

5.2.13 As indicated in Table 11, impacts on annual mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.2.14 Predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 12.

Table 12 Predicted Impacts - $PM_{2.5}$

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Concentration Change as Proportion of Concentration Target (%)	Impact Significance
R1	Residential - City Road East, Manchester	95 - 102% of Concentration Target	0	Negligible
R2	Residential - City Road East, Manchester	76 - 94% of Concentration Target	0	Negligible
R3	Residential - City Road East, Manchester	76 - 94% of Concentration Target	0	Negligible
R4	Residential - City Road East, Manchester	76 - 94% of Concentration Target	0	Negligible
R5	Residential - City Road East, Manchester	103 - 109% of Concentration Target	0	Negligible
R6	Residential - City Road East, Manchester	110% or more of Concentration Target	0	Negligible
R7	Residential - City Road East, Manchester	110% or more of Concentration Target	0	Negligible
R8	Residential - City Road East, Manchester	103 - 109% of Concentration Target	0	Negligible

5.2.15 As indicated in Table 12, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.3 Overall Impact Significance

5.3.1 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the worst-case predicted impact at any

discrete receptor location and the considerations outlined previously. Further justification is provided in Table 13.

Table 13 Overall Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO_2 and PM_{10} concentrations were below the relevant AQOs at all locations in the DM and DS scenarios Predicted annual mean $PM_{2.5}$ concentrations were above the Concentration Target at four sensitive receptors in the DM and DS scenarios. There were no new exceedences in the DS when compared to the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs and Concentration Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates and background concentrations will not reduce in future years. This provides robust results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.2 The IAQM guidance[19] states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

5.4 Interim Planning Guidance for $PM_{2.5}$

5.4.1 Interim Planning Guidance[20] on the consideration of the $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as is

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

20 https://uk-air.defra.gov.uk/pm25targets/planning.

reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 14, along with the development response.

Table 14 Interim Planning Guidance

Question	Response
How has exposure to $PM_{2.5}$ been considered when selecting the development site? Factors to consider include: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development Exposure and emissions during both construction and in-use	The proposals are located in a residential and commercial setting to the south of Manchester City Centre. Crown Street Primary School is approximately 400m west of the site boundary. As outlined in Section 5.2, air quality impacts associated with the development are not predicted to be significant The scheme comprises a car park, which is not considered sensitive to long-term pollutant exposure
What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors and to reduce emissions of $PM_{2.5}$ and its precursors? Factors to consider include: • Site layout • The development's design • Technology used in the construction or installed for use in the development Construction and future use of the development	The site is proposed to be operational until September 2026, therefore any emissions are considered to be short-term and temporary in nature The site boundary is formed of timber hoarding which was previously in place during the demolition of the office buildings. This hoarding will help to minimise the dispersion of any emissions within the car park itself

5.4.2 Based on the responses provided in Table 14 and the results of the assessment, as outlined in Sections 5.0 and 6.0, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of $PM_{2.5}$.

6.0 MITIGATION

6.1.1 A number of mitigation measures have been included within the development to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the site. These are in accordance with MCC's 'Air Quality and Planning Technical Guidance'[21], which is based upon the Good Practice Design Principles outlined in the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[22]. Table 15 describes the good practice principles along with how each has been addressed with regards to the proposals.

Table 15 Good Practice Design Principles for Operational Phase Air Quality Impacts

Phase	Principle	Action
Design Phase	New developments should not contravene the Council's Air Quality Action Plan (AQAP)[23], or render any of the measures unworkable	It is confirmed that the proposals will not contravene MCC's AQAP, or render any of the measures unworkable
	Wherever possible, new developments should not create a new "street canyon", or a building configuration that inhibits effective pollution dispersion	The development will not create a new street canyon or a building configuration that inhibits effective dispersion
	Delivering sustainable development should be the key theme of any application	The proposals are temporary and short term in nature and therefore sustainable measures for long term development are not included within design
Operational Phase	The provision of at least 1 EV "rapid charge" point per 10 residential dwellings and/or 1,000m^2 of commercial floor space. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made	The proposals are for a temporary car park and as such do not meet the criteria for EV charging provision

21 Air Quality & Planning Technical Guidance, MCC, 2022.

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

23 Greater Manchester AQAP 2016-2021, GMCA, 2016.

Phase	Principle	Action
	Where development generates significant additional traffic, provision of a detailed Travel Plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety	A Travel Plan can be requested by the LA if deemed applicable
	All gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh. All gas-fired CHP plant to meet a minimum emissions standard of: • Spark ignition engine: 250mgNO_x/Nm^3; • Compression ignition engine: 400mgNO_x/Nm^3; • Gas turbine: 50mgNO_x/Nm^3. A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of: • Solid biomass boiler: 275mgNO_x/Nm^3 and 25mgPM/Nm^3	The proposals do not include provision of gas-fired boilers or generators

6.1.2 It is considered the above methods would further reduce potential impacts associated with the scheme. Specific mitigation suited to the proposals may be stipulated as a planning condition if deemed necessary by the LA.

7.0 CONCLUSION

7.1.1 Redmore Environmental Ltd was commissioned by Car Park Securities to undertake an Air Quality Assessment in support of a retrospective planning application for a temporary car park on land off City Road East, Manchester.

7.1.2 The development has the potential to cause air quality impacts at sensitive locations during the operational phase. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and consider potential effects as a result of the proposals.

7.1.3 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

7.1.4 Review of the dispersion modelling results indicated that impacts on NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of traffic generated by the development were predicted to be **negligible** at all receptor locations. Following consideration of the relevant issues, impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

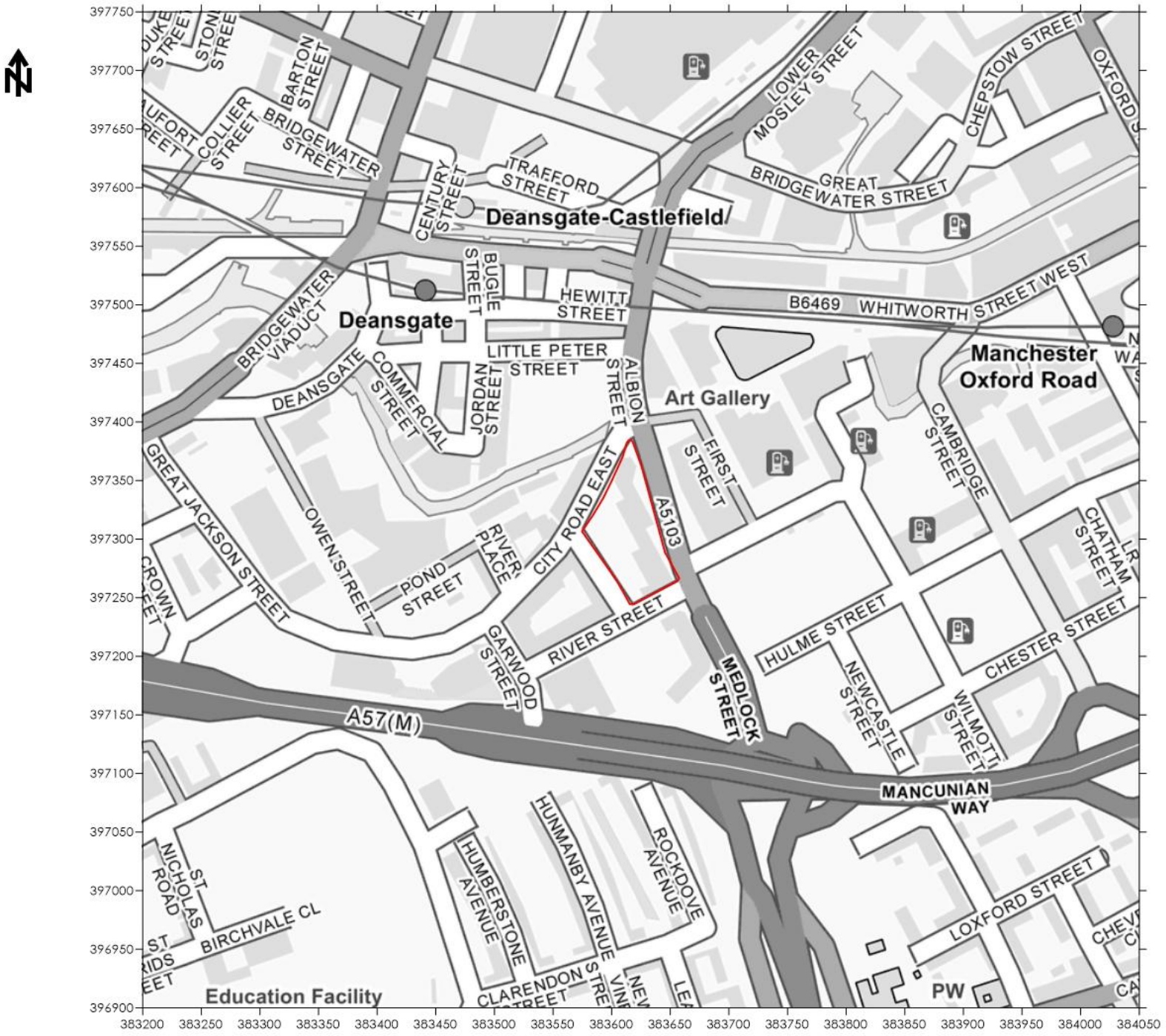
7.1.5 Based on the assessment results, air quality factors are not considered a constraint to the development.

8.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQLV	Air Quality Limit Value
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CERC	Cambridge Environmental Research Consultants
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DPD	Development Plan Document
DS	Do-Something
EB	Eastbound
EFT	Emissions Factor Toolkit
EV	Electric Vehicle
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
MCC	Manchester City Council
NB	Northbound
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm

PfEP	Places for Everyone Plan
SB	Southbound
SP	Slow Phase
TfGM	Transport for Greater Manchester
WB	Westbound
z_0	Roughness length

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location Plan

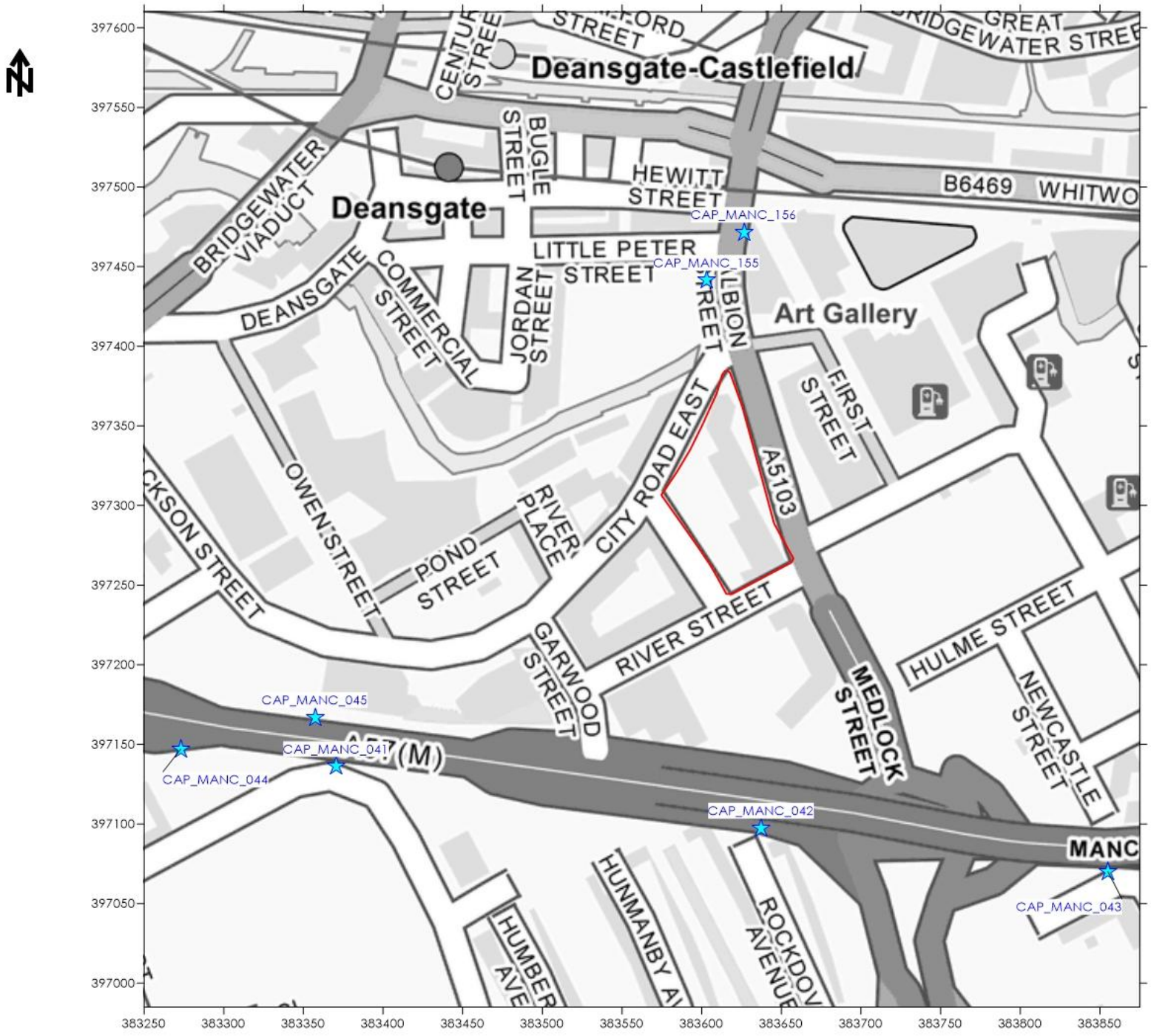
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City Road East, Manchester

Project Reference
10122

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Car Park Securities

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Site Boundary

Monitor

Title
Figure 2 - Monitoring Locations

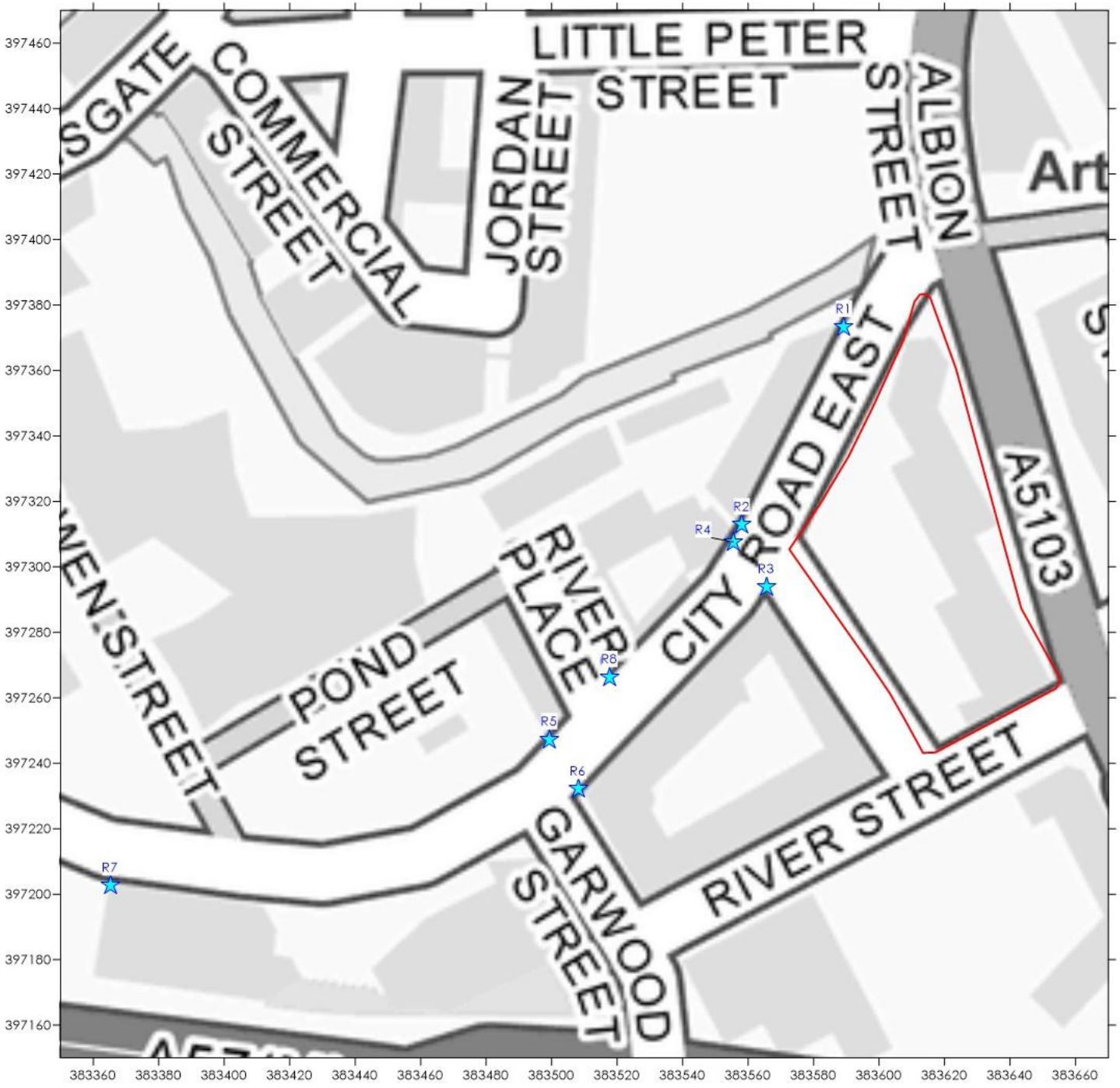
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Receptor

Title
Figure 3 - Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

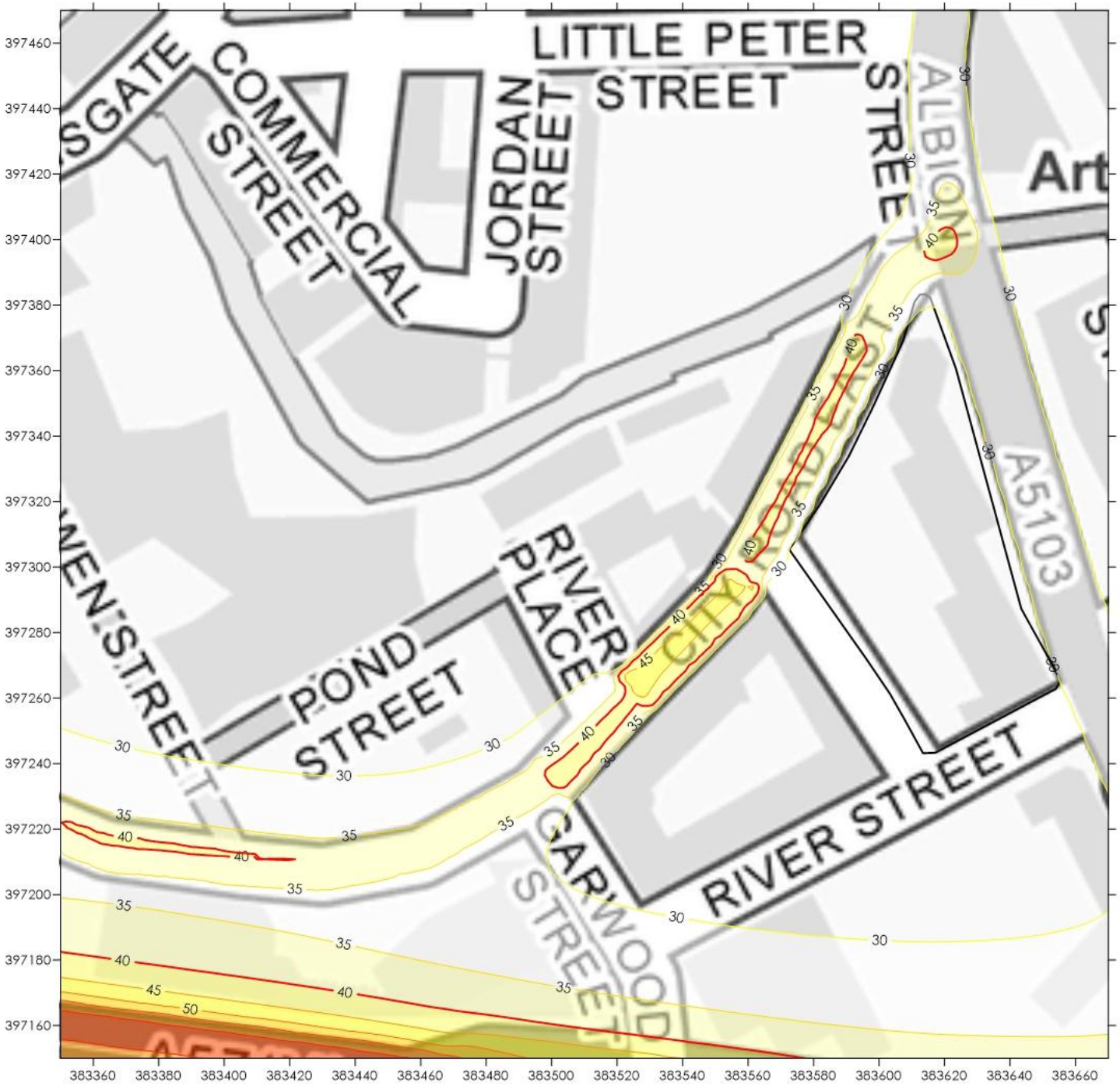
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Site Boundary

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

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60
55
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40
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Figure 4 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$) Do-Minimum

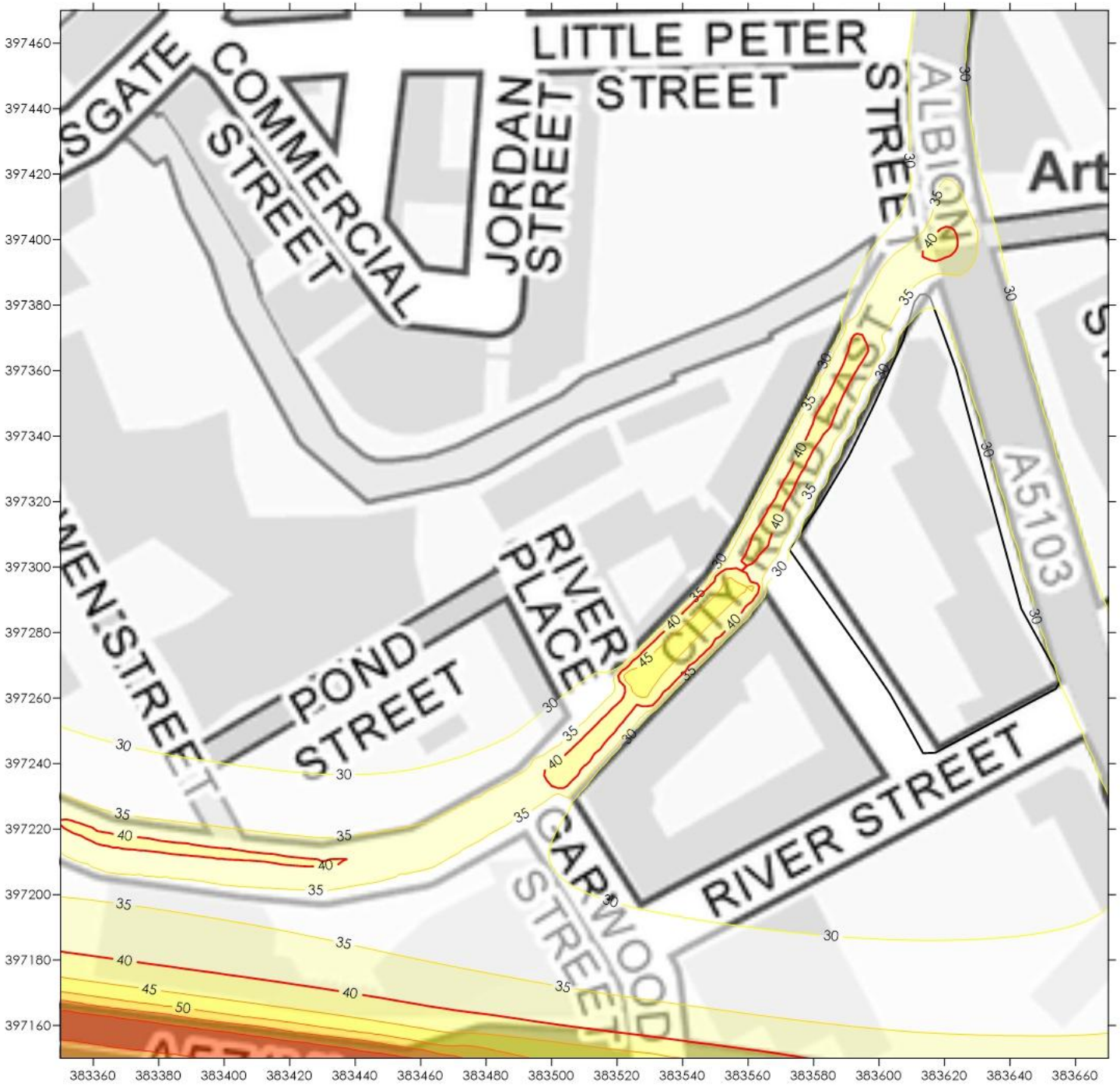
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Annual Mean NO_2 Concentrations ($\mu g/m^3$)

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

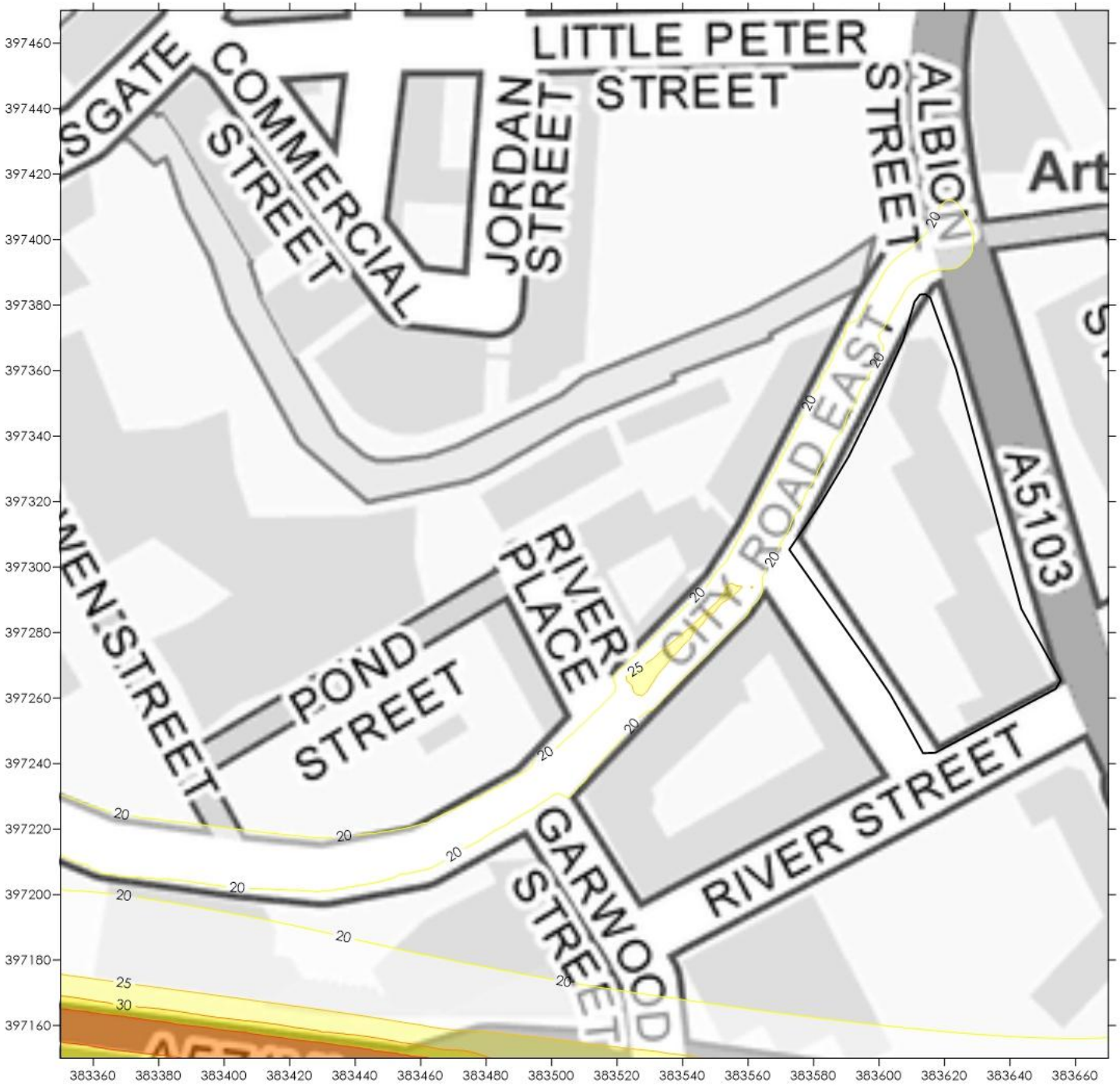
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Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

40
35
30
25
20

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

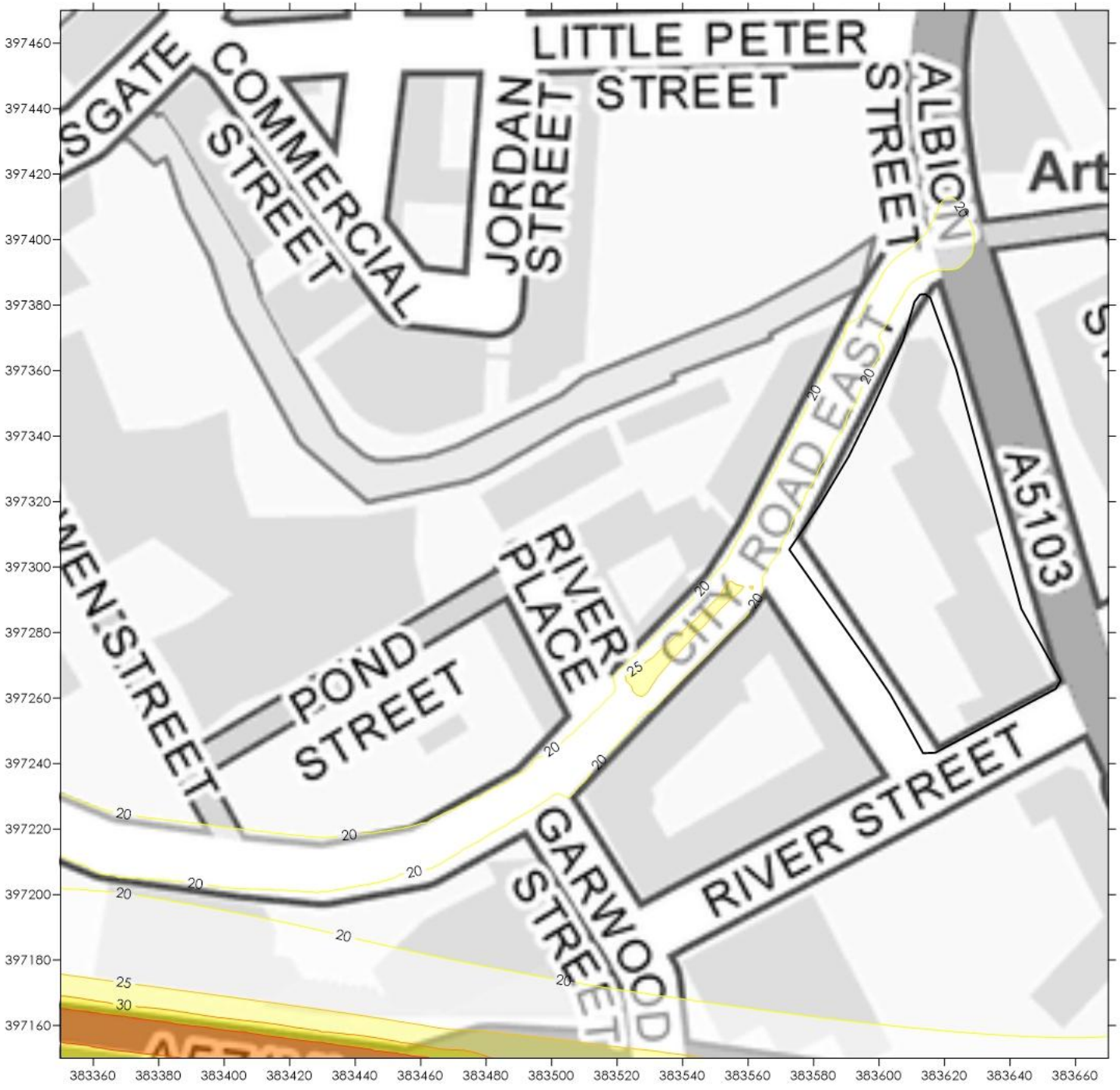
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Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

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Title
Figure 7 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)
Do-Something

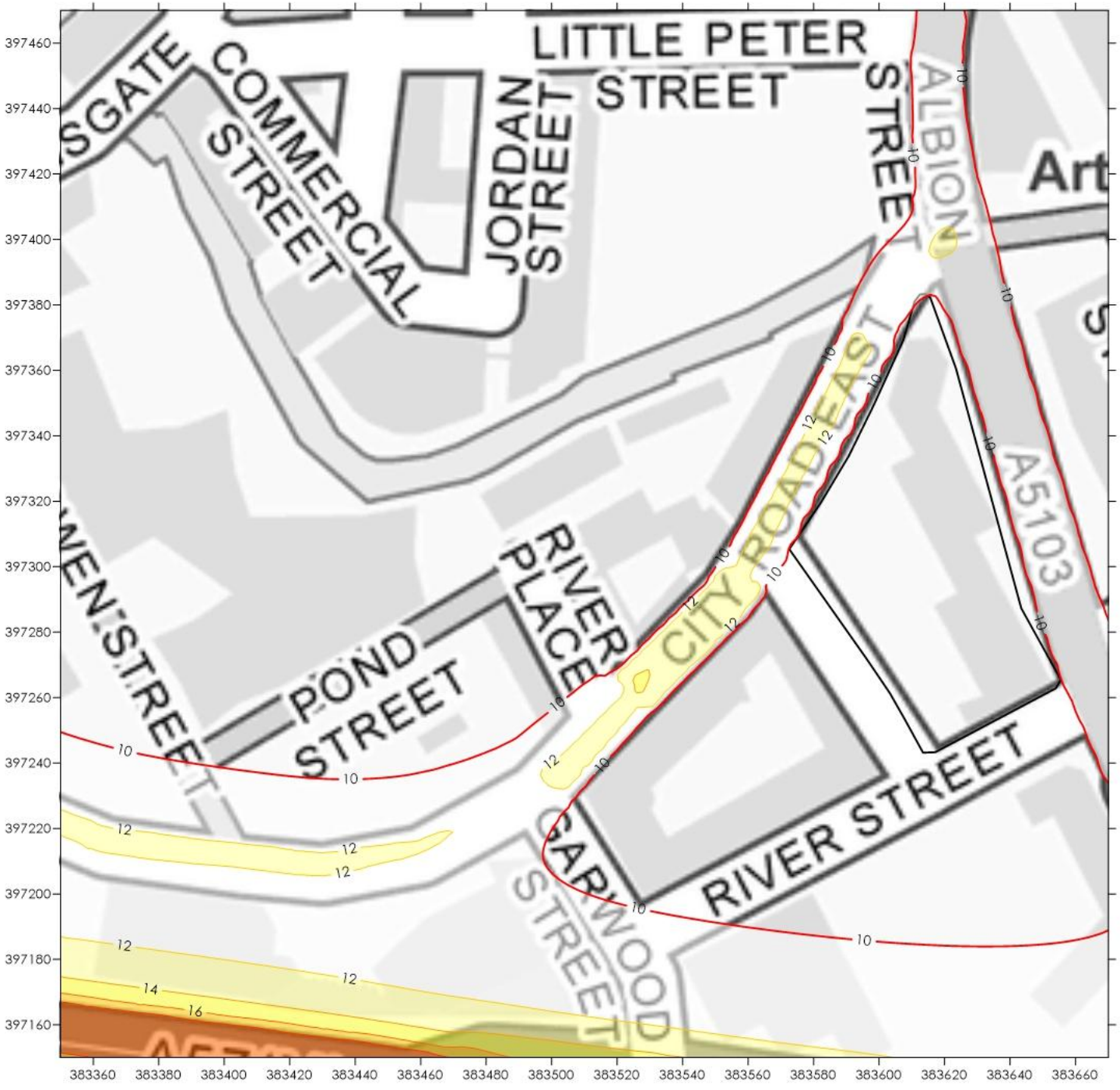
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Site Boundary

Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)

20
18
16
14
12
10

Title
Figure 8 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$) Do-Something

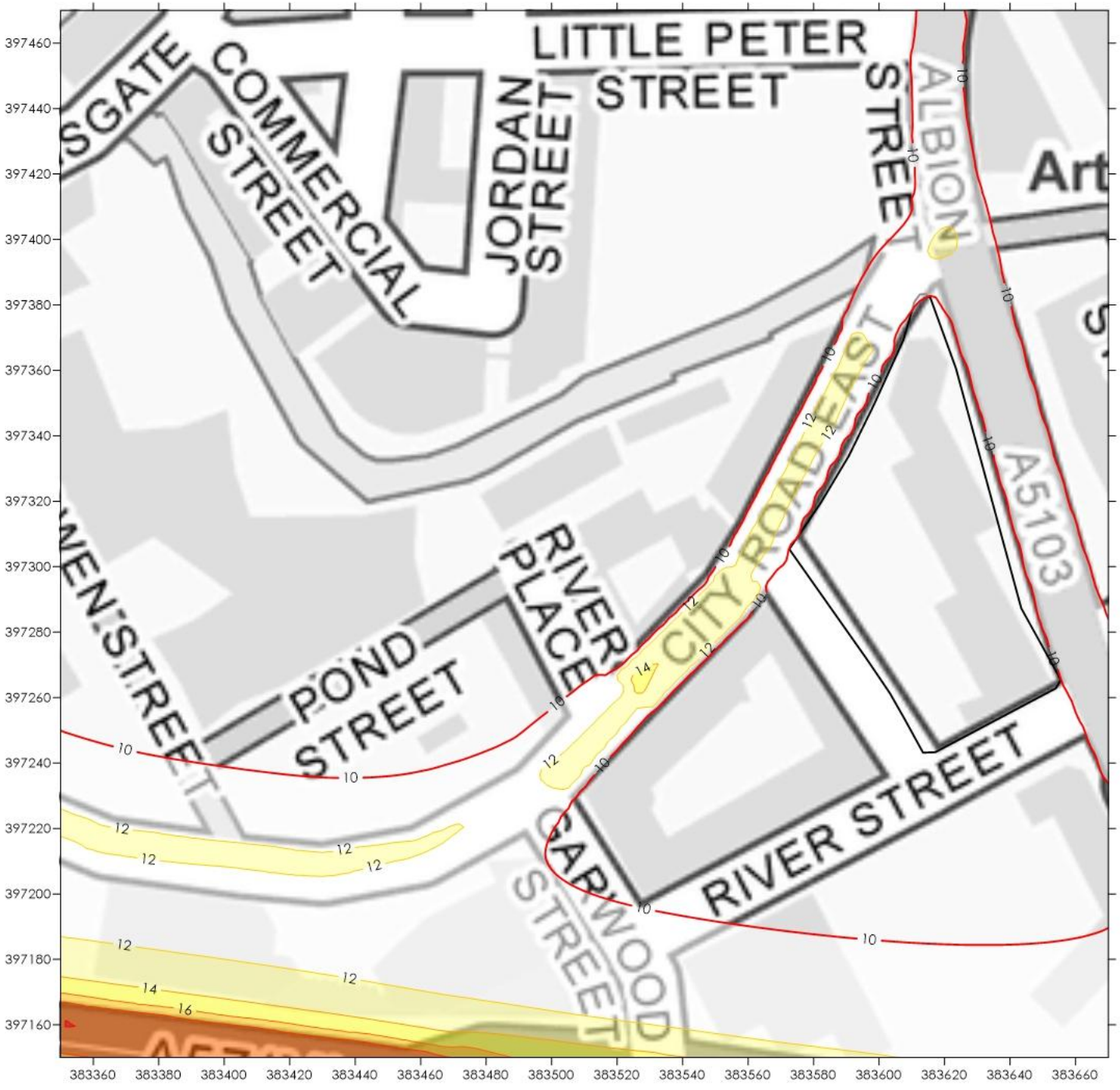
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Site Boundary

Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)

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Title
Figure 8 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)
Do-Something

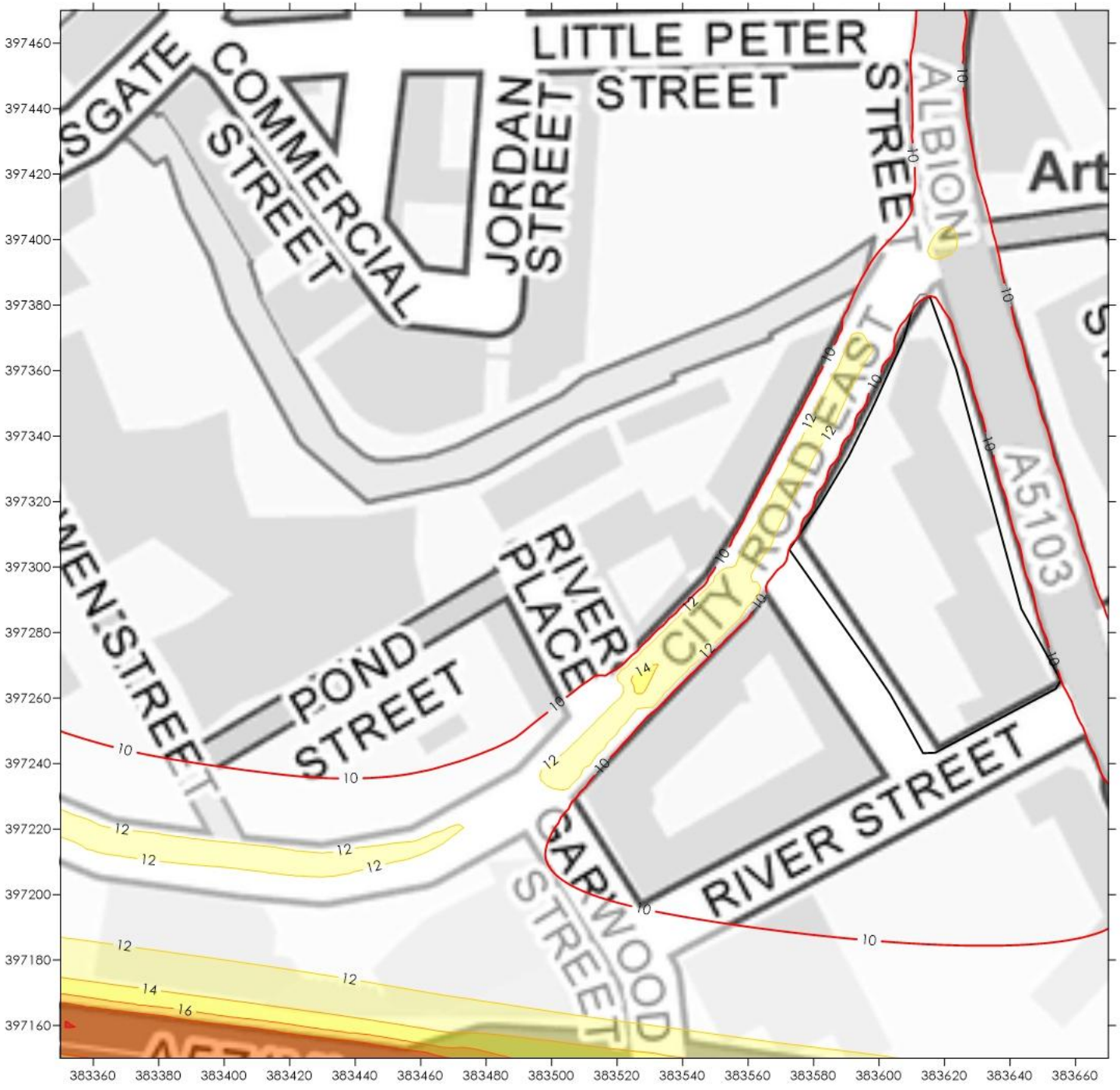
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Site Boundary

Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)

20
18
16
14
12
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Title
Figure 9 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$) Do-Something

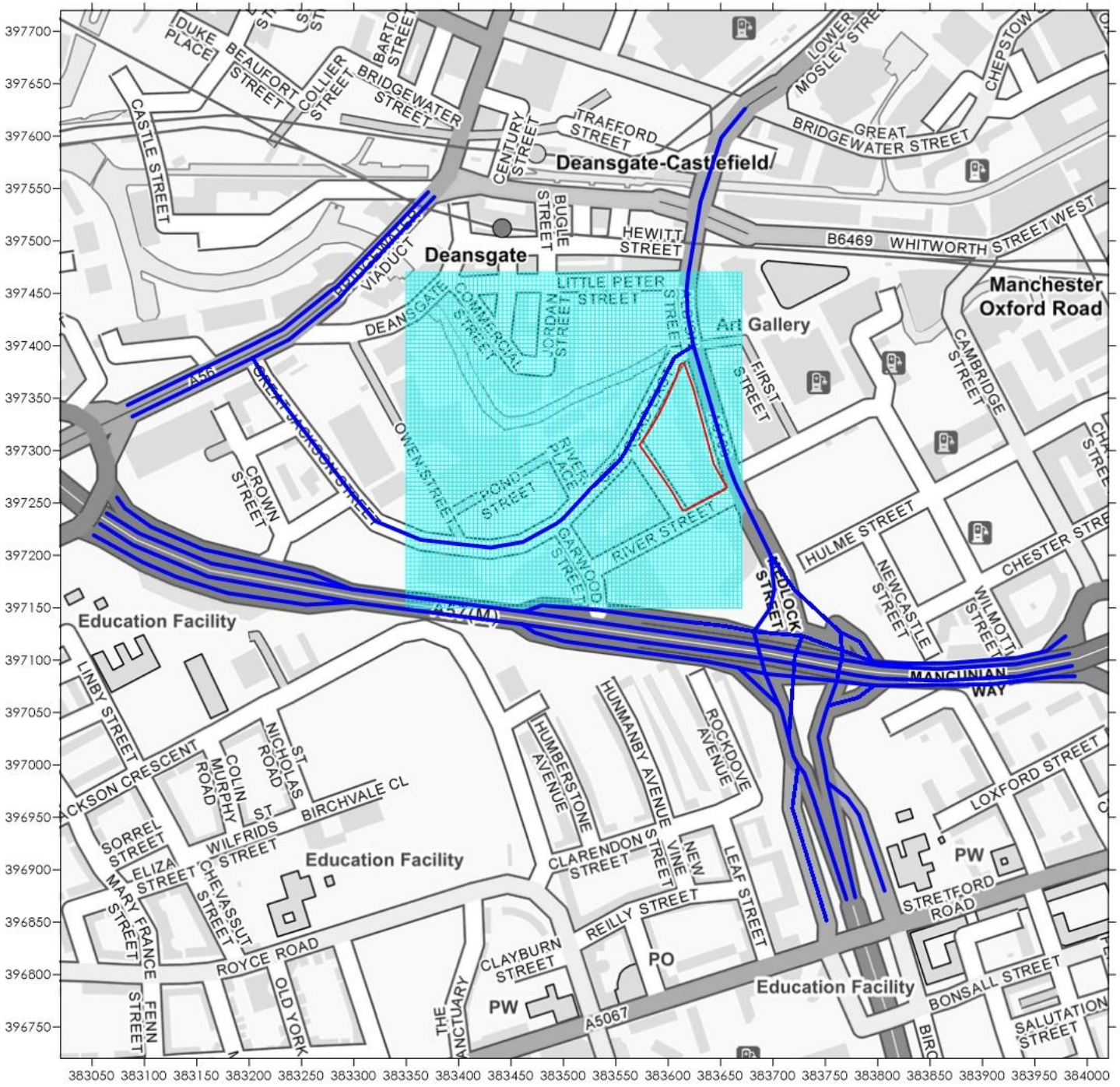
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Site Boundary

Road Link

Output Grid

Title
Figure 10 - ADMS Roads Inputs

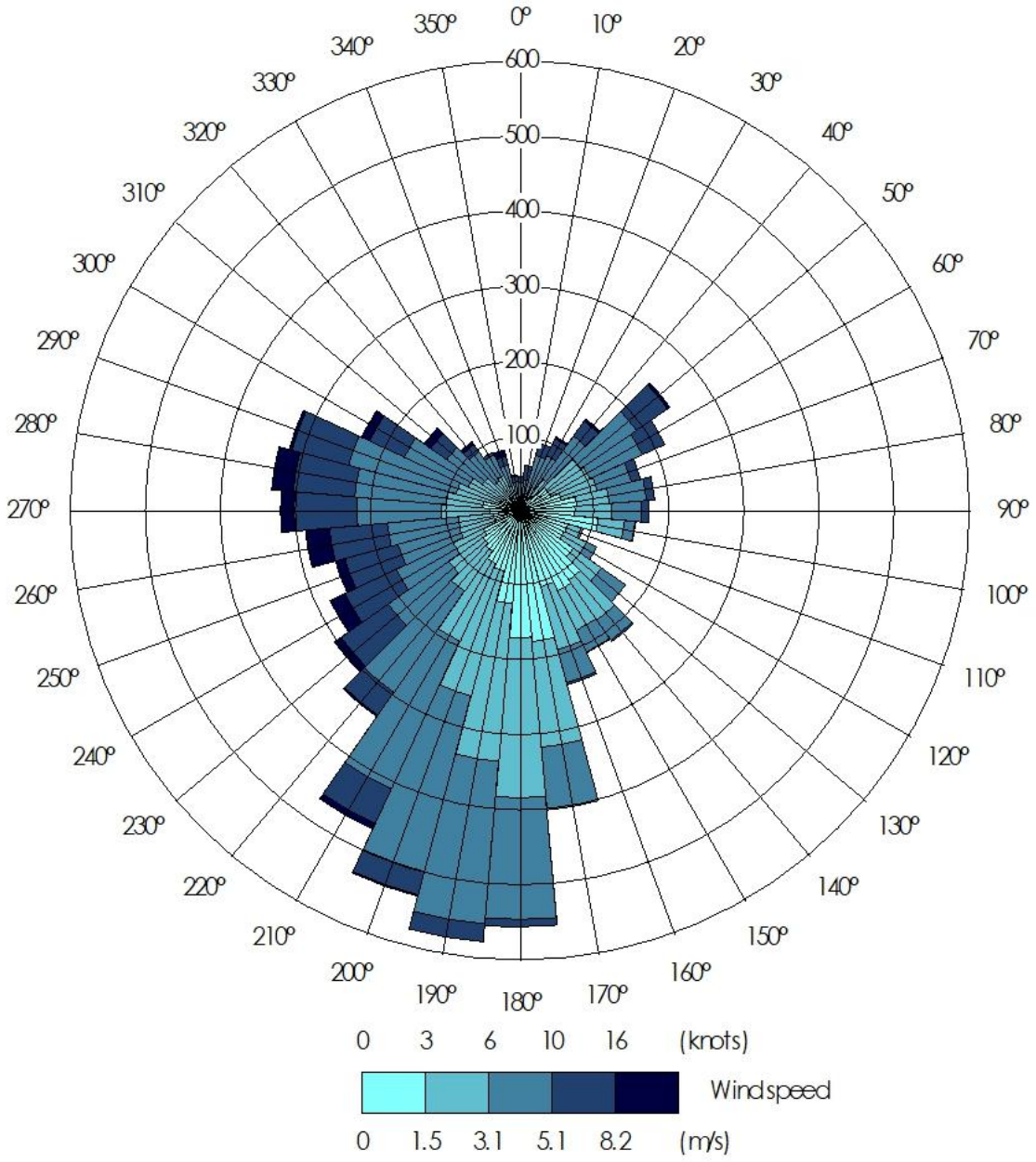
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Title
Figure 11 - Wind Rose of 2024 Manchester Airport Meterological Data

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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of emissions associated with vehicles travelling to and from the site. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.1.0.2). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

Additional options can also be selected within the ADMS-Roads interface to take account of site specific characteristics that may affect model output, such as canyons.

The relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR:383350, 397150 to 383670, 397470. One Cartesian grid was included within the model to produce data suitable for contour plotting

using the Surfer software package. The default intelligent grid spacing option was selected within ADMS-Roads in order to improve contour resolution within the vicinity of sources.

Receptors potentially sensitive to changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Reference should be made to Figure 10 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)[24]. The DfT web tools enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britan for the years 1999 to 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance[25] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

Baseline traffic data was converted to the opening year of the development utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;
- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;
- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance[26];

[24] https://roadtraffic.dft.gov.uk/#6/55.254/-11.107/basemap-regions-countpoints.

[25] Local Air Quality Management (TG22) Technical Guidance, DEFRA, 2022.

[26] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases were derived using the approaching distance of 25m outlined in the DEFRA guidance[27], and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

A summary of the traffic flow data is provided in Table A1.1.

Table A1.1 Traffic Data Verification and DM Scenarios

Link		24-hour AADT Flow			HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		Verif.	2026 DM	2026 DS			
L1	Chester Road, Eastbound (EB), west of Great Jackson Street	6,747	6,914	7,002	2.25	7.1	45
L2	Chester Road, EB, east of Great Jackson Street	6,747	6,914	7,002	2.25	6.0	45
L3	Chester Road, Westbound (WB), west of Great Jackson Street	8,028	8,227	8,315	3.18	10.6	45
L4	Chester Road, WB, east of Great Jackson Street	8,028	8,227	8,315	3.18	6.7	45
L5	Great Jackson Street, approach to Chester Road, Slow Phase (SP)	11,647	11,936	12,111	2.70	14.3	20
L6	Great Jackson Street, south of Chester Road	11,647	11,936	12,111	2.70	9.9	30
L7	City Road East, between Garwood Street and River Place, right-sided canyon	11,647	11,936	12,111	2.70	6.9	30
L8	City Road East, between River Place and Shortcroft Street, canyon	11,647	11,936	12,111	2.70	8.9	30
L9	City Road East, between Shortcroft Street and site access, left-sided canyon	11,647	11,936	12,111	2.70	9.0	30
L10	City Road East, north of site access, left-sided canyon	11,647	11,936	12,111	2.70	9.6	30
L11	City Road East, approach to A5103 Medlock Street, SP	11,647	11,936	12,111	2.70	9.4	20

27 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		24-hour AADT Flow			HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		Verif.	2026 DM	2026 DS			
L12	A5103 Medlock Street, between City Road East and Little Peter Street	11,647	11,936	12,024	2.70	15.4	30
L13	A5103 Medlock Street, between Little Peter Street and B6469 Whitworth Street West, SP	11,647	11,936	12,024	2.70	12.1	20
L14	A5103 Medlock Street, north of B6469 Whitworth Street West	11,647	11,936	12,024	2.70	17.1	30
L15	A5103 Medlock Street, south of City Road East	11,647	11,936	12,024	2.70	17.3	30
L16	A5103 Medlock Street, Southbound (SB), approach to A5103 Medlock Street E/WB and A5103 Princess Road	5,824	5,968	6,056	2.70	15.9	30
L17	A5103 Medlock Street, SB, approach to A5103 Princess Road, SP	2,912	2,984	3,072	2.70	9.9	20
L18	A5103 Medlock Street, SB, approach to A5103 Medlock Street EB, SP	2,912	2,984	3,072	2.70	4.5	20
L19	A5103 Princess Road, SB, exit from A5103 Medlock Street SB	2,912	2,984	3,072	2.70	7.6	30
L20	A5103 Princess Road, SB, south of Mancunian Way	19,661	20,149	20,237	2.57	6.9	30
L21	A5103 Medlock Street, Northbound (NB), exit from junction with A5103 Princess Road, SP	5,824	5,968	6,056	2.70	8.2	20
L22	A5103 Medlock Street, NB, junction with A5103 Princess Road, SP	12,143	12,444	12,532	1.90	7.4	20
L23	A5103 Princess Road, NB, south of A5103 Medlock Street	24,286	24,888	24,976	1.90	13.5	30
L24	A5103 Princess Road, NB, approach to A5103 Medlock Street EB, SP	3,929	4,026	4,114	3.38	7.1	20
L25	A5103 Princess Road, NB, approach to A5103 Medlock Street WB, SP	12,143	12,444	12,532	1.90	3.9	20
L26	A5103 Medlock Street, WB, approach to A5103 Princess Road SB, SP	9,831	10,074	10,162	2.57	7.7	20
L27	Stretford Road, NB sliproad onto A5103 Princess Road, SP	6,072	6,222	6,310	1.90	4.7	20

Link		24-hour AADT Flow			HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		Verif.	2026 DM	2026 DS			
L28	A5103 Princess Road, SB, sliproad onto Stretford Road, SP	4,915	5,037	5,125	2.57	4.7	20
L29	Sliproad from A56 Chester Road roundabout, onto A57(M) EB	10,966	11,237	11,325	2.82	4.6	30
L30	Sliproad from A57(M) WB, onto A56 Chester Road roundabout	11,399	11,681	11,769	2.70	6.9	30
L31	A57(M), EB, west of A56 Chester Road roundabout sliproad	43,862	44,950	45,038	2.82	7.4	45
L32	A57(M), WB, west of A56 Chester Road roundabout sliproad	45,595	46,726	46,814	2.70	8.3	45
L33	A57(M), EB, between sliproads	43,862	44,950	45,038	2.82	10.8	45
L34	A57(M), WB, between sliproads	45,595	46,726	46,814	2.70	14.2	45
L35	A57(M), EB, sliproad onto A5130 Medlock Street	7,857	8,052	8,140	3.38	7.4	45
L36	A57(M), EB, sliproad onto A5130 Medlock Street, SP	7,857	8,052	8,140	3.38	7.9	20
L37	A57(M), WB, sliproad from A5130 Princess Road	7,935	8,131	8,219	3.24	5.8	45
L38	A57(M), EB, east of A5130 Medlock Street sliproad	31,428	32,207	32,295	3.38	7.9	45
L39	A57(M), WB, east of A5130 Princess Road sliproad	31,738	32,525	32,613	3.24	7.9	45
L40	A5130 Medlock Street, EB, exit from A57(M) EB sliproad	3,929	4,026	4,114	3.38	8.1	20
L41	A5130 Medlock Street WB, approach to A57(M) WB sliproad	4,528	4,640	4,728	3.34	9.2	20
L42	A5130 Medlock Street, EB, east of A5130 Princess Road	7,340	7,522	7,610	3.83	7.4	45
L43	A5130 Medlock Street, WB, east of A5130 Princess Road, SP	9,055	9,280	9,368	3.34	5.6	20
L44	A5130 Medlock Street, WB, east of A5130 Princess Road	9,055	9,280	9,368	3.34	7.5	45
L45	A5130 Princess Road, approach to A5130 Medlock Street NB, SP	12,143	12,444	12,532	1.90	7.4	20

Reference should be made to Figure 10 for a graphical representation of the road link locations.

Canyons

Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when understanding dispersion modelling.

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which has been retained in version 5.1.0.2. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

Canyons have five principal effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings - as if there were no canyon; and,
- Pollutants leave the canyon from the canyon top.

The combined modelling of these effects will result in concentration patterns unique to each canyon. The parameters used in the verification model are outlined in Table A1. 2. It should be noted that here buildings are only present on one side of the road, parameters were purposely included at 0m.

Table A1. 2 Canyon Parameters

Link	Parameter (m)					
	Canyon Width to Left	Average Height of Buildings to Left	Building Length Left	Canyon Width to Right	Average Height of Buildings to Right	Building Length Right
L7	0.0	0.0	0.0	8.5	21.0	36.4
L8	7.2	31.5	48.2	8.5	21.0	48.2
L9	7.7	28	52.5	0.0	0.0	0.0
L10	7.6	28	31	0.0	0.0	0.0

A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar canyon properties. Network mode analysis the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out the end of a canyon. Network mode is considered most accurate for detailed local analysis and as such was selected for us in the model.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the EFT (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2024 emission factors were utilised in preference to the development future year in order to provide robust model outputs. As predictions for 2024 were verified, it is considered the results are a robust indication of conservative concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2024 to 31st December 2024 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 12.6km south of the development. It is

anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 11 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'cities, woodland'.

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

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological data. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'mixed urban/ industrial'.

Background Concentrations

Annual mean NO_2, PM_{10} and $PM_{2.5}$ background concentrations for use in the assessment were taken from the DEFRA mapping grid square containing the site, as shown in Table 5.

Background concentrations from 2024 were utilised in preference to the development future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance[28].

Verification

The results from a dispersion model may differ from measures concentrations for a large number of reasons, including.

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2024 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO_2 concentrations was undertaken at four locations within the vicinity of roads included within the model during 2024. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[29]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A1. 3.

[28] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

[29] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1. 3 NO_x Verification - Monitoring Results

Monitoring Location	Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
CAP_MANC_041	35.90	39.49
CAP_MANC_042	32.50	29.77
CAP_MANC_045	50.60	90.58

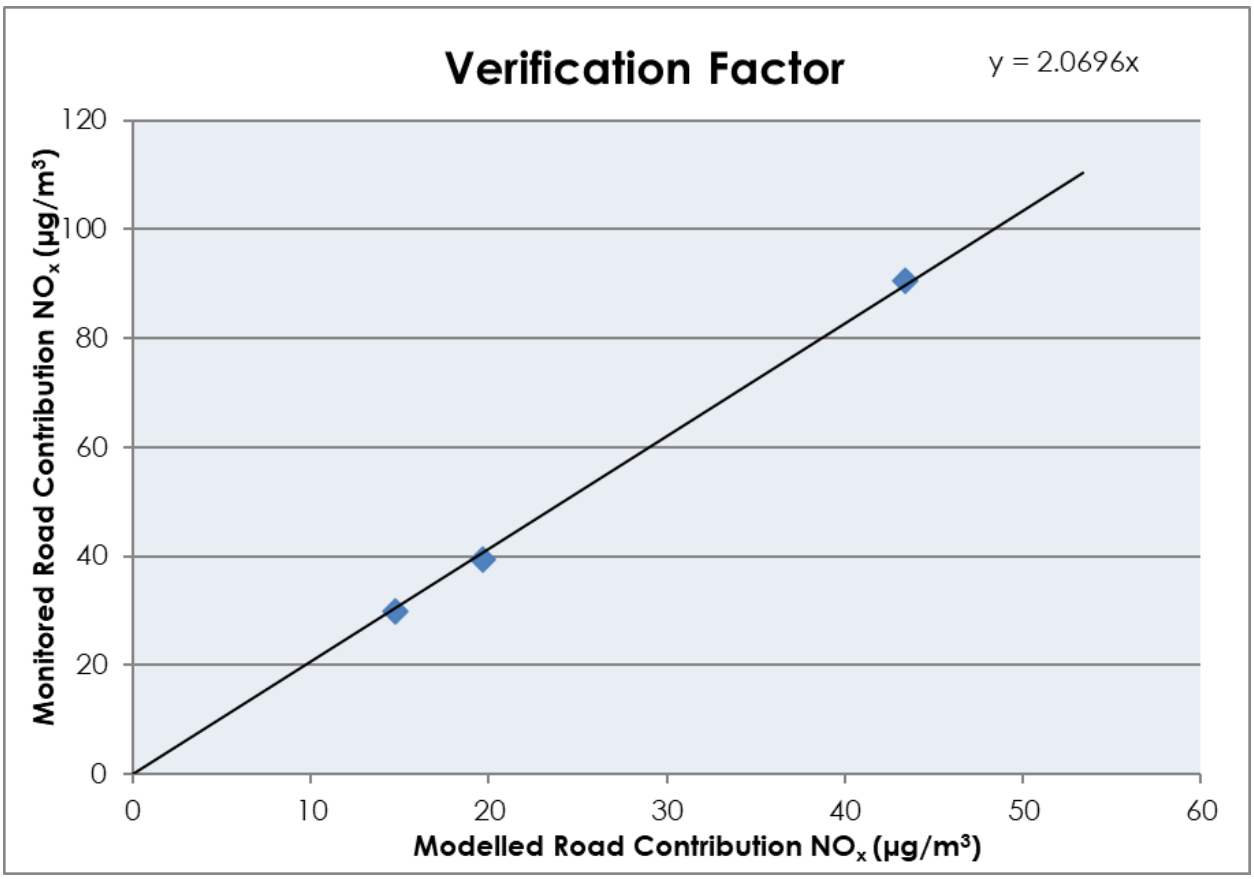
The annual mean road NO_x concentrations predicted from the dispersion model and the 2024 road NO_x concentrations calculated from the monitoring results are summarised in Table A1. 4.

Table A1. 4 NO_x Verification - Modelling Results

Monitoring Location	Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
CAP_MANC_041	39.49	19.69
CAP_MANC_042	29.77	14.75
CAP_MANC_045	90.58	43.37

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 2.0696 was required to be applied to all modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Monitoring of PM_{10} or $PM_{2.5}$ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA Guidance[30].

[30] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

EMILY PEARS-RYDING

Director

BSc (Hons), MIAQM, MIEnvSc

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KEY EXPERIENCE:

Emily is a Director with specialist experience in the air quality sector Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-6. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Assessment of potential effects associated with network realignment schemes and highway developments.

SELECT PROJECTS SUMMARY:

Broad Street, Birmingham

Air Quality Assessment in support of a residential-led development on land at Broad Street, Birmingham. The proposals were located adjacent to a section of the Midland Metro Westside which runs along Broad Street. Consideration was made to the potential for re-alignment of the local road network as a result of the Metro to effect pollution levels at the development. The assessment indicated NO_2 concentrations exceeded air quality criteria from ground to third floor level as a result of road vehicle exhaust emissions. Mitigation was therefore specified for the affected units.

Home Farm, Forest Road, Warfield

Ecological Air Quality Assessment in support of a residential development. Natural England held concerns regarding potential impacts at sensitive ecological designations as a result of traffic exhaust emissions associated with the development. The predicted change in NO_x and ammonia concentrations and nitrogen and acid deposition was below the relevant criteria at all locations within the ecological designations. Impacts were therefore not considered to be significant.

Saltcoats Road, Stevenston

Air Quality Assessment in support of an educational campus and associated energy centre. Impacts associated with emissions from the proposed gas and biomass boilers were assessed through detailed dispersion modelling. This indicated impacts on annual mean NO_2 and PM_{10} concentrations were predicted to be not significant.

Blackthorn & Piddington

Environmental Impact Assessment in support of a railway embankment scheme on land at the Network Railway Embankment between Piddington and Blackthorn. Due to the extensive stabilisation works a Fugitive Dust Emissions Assessment was undertaken in addition to consideration of road vehicle exhaust emissions. Due to the location of the site in relation to nearby sensitive receptors, potential impacts associated with construction works were not considered to be significant.

Blackmoorfoot Road, Huddersfield

Air Quality in support of a residential-led development in close proximity to an operational minerals facility. Due to the presence of the Johnsons Wellfield Quarry to the south of the site a Fugitive Dust Emissions Assessment was undertaken to determine potential impacts. Dispersion modelling of road vehicle exhaust emissions was also undertaken in support of the scheme. Results indicated the overall significance of fugitive dust emissions from the quarry and air quality impacts associated with operation of the development itself were not significant.

Lockwood Bar, Huddersfield

Air Quality Assessment for the proposed highway realignment scheme along Lockwood Road, Huddersfield. Changes in pollution levels were considered at sensitive receptors as a result of variations to road geometry and associated redistribution of vehicle trips across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.

CHARLOTTE JONES

Graduate Air Quality Consultant

BSc (Hons)

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KEY EXPERIENCE:

Charlotte is a Graduate Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of construction dust impacts from a range of development sizes.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Production of Air Quality Neutral Assessments in accordance with The London Plan.
- Odour surveys and risk assessments to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Stretford Memorial Hospital, Stretford

Air Quality Assessment in support of the demolition of the former Stretford Memorial Hospital and construction of 29 residential dwellings alongside car parking and associated infrastructure. The site was located adjacent to an Air Quality Management Area (AQMA) therefore there was concern that there could be potential impacts due to vehicle movements as a result of the site within this sensitive area as well as exposure of future occupants to poor air quality due to traffic emissions. Results indicated that potential impacts were predicted to be not significant and the site was considered suitable for the proposed end use.

River Road, Barking

Air Quality Assessment and Air Quality Neutral Assessment in support of an industrial development to provide a temporary contractors yard. A Fugitive Dust Emissions Assessment was required to determine potential impacts of operational phase fugitive dust emissions. Dispersion modelling of road vehicle exhaust emissions was also undertaken in support of the scheme. The site was concluded to be Air Quality Neutral in accordance with the relevant guidance and the overall impacts of fugitive dust emissions and road vehicle exhaust emissions associated with the site were concluded to be not significant.

Crewe Road, Shavington

An Odour Assessment in support of a residential development with associated access, infrastructure and landscaping works. The development was located in the vicinity of a meat processing facility which may form a source of odour emissions and cause loss of amenity to future residents. A two stage Odour Assessment was undertaken to assess baseline conditions across the site and consider the risk of reduced amenity. Results of the assessment indicated odour effects at the site did not represent a constraint to planning consent.

Land North of Parklands, Waltham Abbey

Air Quality Assessment in support of a residential development comprising 400 dwellings, a local centre and public open space. Detailed dispersion modelling was undertaken to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Review of the dispersion modelling results indicated that residual impacts due to the operation of the development were considered to be not significant.

Masshouse Lane, Birmingham

Air Quality Assessment in support of a mixed-use development to provide a new part-three, part-six storey building including ground and first floor retail space with a mix of residential dwellings from first to sixth floor, to provide 10 residential units. The site was located within an AQMA therefore there was concern that future occupants could be exposed to existing air quality conditions due to traffic emissions as well as potential impacts to sensitive receptors due to vehicle movements as a result of the proposals. Results revealed negligible impacts at all locations and that pollution levels were below the air quality objectives across the development.

LAUREN MASSINGHAM

Associate Air Quality Consultant

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KEY EXPERIENCE:

Lauren is an Associate with specialist experience in the air quality sector. Her key capabilities include:

- Undertaking and managing a variety of air quality projects in a range of sectors including residential, student accommodation, educational, commercial and industrial projects
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-6. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Co-ordination and management of multi-disciplinary projects and submissions.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Active STEM Ambassador role, working with local schools to educate about air quality.

SELECT PROJECTS SUMMARY:

Norton Lodge, Malton

An ES Chapter and technical appendix were supplied to support this EIA development. The development comprised a new link road and therefore required multiple assessment scenarios. The Chapter also looked at impacts at ecological designations, impacts with an AQMA, odour from neighbouring facilities and impacts on proposed receptors. The AQMA in Malton was a particular concern for the council. The overall impact was considered to be not significant.

Yorkshire Post Phase 2, Leeds

An Air Quality Assessments to support each of the three proposed towers which form part of the Yorkshire Post Phase 2. These high-rise buildings were proposed for student accommodation and commercial uses. In addition to following LAQM.TG(22) and EPUK&IAQM guidance, the West Yorkshire Low Emissions Strategy (WYLES) Air Quality & Emissions Technical Planning Guidance was followed. Due to the 'Major' development classification in line with the WYLES guidance, damage costs for each tower were calculated. Mitigation measures were suggested. The energy strategy for the development was for a connection to the Leeds PIPES local heating district network.. The scheme was approved.

Old Hall Street, Liverpool

An Air Quality Assessment to support a student accommodation development. The scheme is 'car free' and trips generated dispersed to below the threshold once off Old Hall Street. The Site was considered suitable for residential use.

Viadux Phase 2, Manchester

Environmental Impact Assessment to support a high-rise residential led scheme in the city centre. The assessment included both operational and construction phase impacts. Impacts with both phases were considered to be 'not significant'. Additionally, in line with Manchester City Council Air Quality Guidance a Damage Cost calculation was included to ensure that sufficient mitigation was included to reduce air quality impacts as much as possible.

Plot 9b, First Street, Manchester

An ES Chapter to support the EIA development on land off First Street. The assessment included operational and construction phase impacts, in addition to modelling to ensure site suitability. Additionally, in line with Manchester City Council Air Quality Guidance a Damage Cost calculation was included to ensure that sufficient mitigation was included to reduce air quality impacts as much as possible. This included improving footpaths so that the site linked to other Plots within the wider First Street development. The Chapter concluded that impacts were considered not significant.

Winwick Road, Warrington

Air Quality Assessment for the proposed B2/B8 development in Warrington. Changes in pollution levels were considered at sensitive receptors as a result of trips generated and their distribution across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.