

MILLER GOODALL
ACOUSTICS AND AIR QUALITY

AIR QUALITY ASSESSMENT

on behalf of

SEED ARCHITECTS LTD

for

70 HIGH STREET, MANCHESTER

REPORT DATE: 9 MAY 2023

REPORT NUMBER: 103021

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Summary

This air quality report has been prepared to accompany a planning application for a proposed hotel development at 70 High Street, Manchester. It assesses the potential changes in air quality due to the proposed development and whether these potential changes would significantly alter air quality.

Concentrations of NO_2 and PM_{10} are likely to be below their respective short-term objectives at the proposed development site which is therefore considered suitable for its intended use, with regards to air quality. Concentrations of $PM_{2.5}$ are expected to be below the annual mean target.

The proposed development is not expected to have a significant impact on local air quality.

There is, therefore, no reason for this application to be refused on the grounds of air quality.

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Signed		Signed	
Date	9 May 2023	Date	9 May 2023

Record of changes

Version	Date	Change	Initials
1	9 May 2023	First issue	MH

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1 Introduction

1.1 Miller Goodall Ltd has been instructed to prepare an air quality assessment to accompany a planning application for a proposed Hotel development at 70 High Street, Manchester. The site lies within the administrative boundary of Manchester City Council (MCC).

1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality following Local Air Quality Management Technical Guidance[1] and EPUK and IAQM guidance[2].

1.3 The report provides an assessment of the potential air quality impacts associated with the operational phase of the proposed development. The suitability of the site for the intended use is also assessed.

1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO_2) and fine particulates, normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM_{10}) and 2.5 micrometres ($PM_{2.5}$) since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO_2, PM_{10} and $PM_{2.5}$.

2 Site Description

2.1 The site is located within Manchester city centre surrounded by commercial premises.

2.2 The development site is located on the corner of High Street and Turner Street. Beyond the High Street to the west is Arndale Market. Edgehill Street runs along the eastern site boundary. Commercial premises are located directly to the south of the development. The site location is shown in **Appendix A**.

3 Proposed Development

3.1 The proposed development consists of a conversion of the existing building at 70 High Street to form a hotel comprising 26 rooms, there will also be the addition of dormers. All of the hotel accommodation rooms are situated on the first floor and above, the ground floor only houses stairs and a lift.

3.2 There are no car parking spaces associated with the proposed development.

4 Policy Context

4.1 Air Quality Objectives

4.1.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality

[1] Department for the Environment Food and Rural Affairs (2018) '*Local Air Quality Management Technical Guidance Document LAQM.TG (22)*', London: Defra.

[2] EPUK and IAQM (January 2017) Land Use Planning and Development Control: Planning for Air Quality (v1.2)

Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.

4.1.2 The United Kingdom left the European Union on 31st January 2020 and is no longer a member state. However, the current framework of air quality legislation was converted into domestic law through the European Union (Withdrawal) Act 2018[3].

4.1.3 The relevant air quality standards and objectives are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health.

Table 1: Air Quality Strategy Objectives (England) for the Purposes of Local Air Quality Management

Pollutant	Air Quality Objective	
	Concentration	Measured As
Nitrogen dioxide (NO_2)	200 µg/m^3	1-hour mean not to be exceeded more than 18 times per year
	40 µg/m^3	Annual mean
Particles (PM_{10})	50 µg/m^3	24-hour mean not to be exceeded more than 35 per year
	40 µg/m^3	Annual mean
Particles ($PM_{2.5}$)	25 µg/m^3	Annual mean (target)

4.1.4 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.

4.1.5 Possible exceedances of air quality objectives are generally assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

4.1.6 As the development is for hotel use, the annual mean air quality objectives do not apply; however, the short-term objectives still apply[1].

[3] UK Parliament (2018): http://www.legislation.gov.uk/ukpga/2018/16/contents/enacted

4.2 MCC (2022) Air Quality and Planning Technical Guidance

4.2.1 The MCC Air Quality and Planning Technical Guidance[4] recommends the use of IAQM guidance to assess the impact of construction and operational phases of developments. Air quality assessments should also consider compliance with relevant air quality objectives for key air pollutants.

4.2.2 A simple air quality assessment has been prepared to determine the impact of the construction and operational phases of the development on existing receptors and the suitability of the site for its intended use[4].

4.3 Greater Manchester Action Plan 2016-2021

4.3.1 The Greater Manchester Combined Authority (GMCA) Air Quality Action Plan 2016-2021 [5] provides information in respect of the actions planned by the Greater Manchester Authorities in relation to declared AQMAs. Action Plans are the mechanism by which the local authorities, in collaboration with national agencies and others, outline their plans for working towards achieving the air quality objectives through the powers available to them. In relation to managing new development, the action plan states that:

*"**Action 1.1***

Greater Manchester (GM)councils to adopt the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction as current best practice to assess and mitigate emissions from construction sites. i. Where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested.

Action 1.2

GM local authorities will adopt the most recent IAQM/EPUK guidance for air quality assessment as current best practice, to help ensure that planning applications consider potential local air quality impacts and opportunities to improve air quality are realised. i. Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested. ii. The IAQM/EPUK guidance will also be used to screen and assess industrial sources, such as boilers or large stationary engines. GM local authorities to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Air Quality Management Areas (AQMAs). Where an air quality assessment is triggered, it should include a review of monitoring data. Where monitoring is not currently undertaken, it may be requested to inform the application or to confirm the effects."

4.3.2 In January 2019, the joint GMCA & AQMA executive board met for the Greater Manchester Clean Air Plan: Update January 2019. Within the document, it states that Greater Manchester has signed up to become a World Health Organisation (WHO) 'BreatheLife' city, with the associated aim of achieving WHO air quality targets by 2030. The WHO air quality targets refer to the 2005 Air Quality Guidelines (AQG), not the 2021 AQG. For NO_2 concentrations the WHO 2005 AQG is 40 µg/m^3, for PM_{10} it is 20 µg/m^3 and for $PM_{2.5}$ it is 10 µg/ m^3. It should be noted that the WHO AQGs are not legal requirements.

[4]MCC (2022) Air Quality and Planning Technical Guidance

[5] GMCA (2016) Greater Manchester Air Quality Action Plan 2016-2021

5 Methodology

5.1 Data Sources

5.1.1 The air quality assessment has been undertaken and prepared with reference to information from several sources, as detailed in **Table 2**.

Table 2: Key Information Sources

Data Source	Reference
Greater Manchester Combined Authority (GMCA)	GMCA (2016) *Greater Manchester Air Quality Action Plan 2016-2021* GMCA (2022) *2021 Air Quality Annual Status Report for Greater Manchester* GMCA (2021) *2020 Air Quality Annual Status Report for Greater Manchester* GMCA Clean Air Greater Manchester (website)
Department for Environment Food and Rural Affairs (Defra)	Defra *Local Air Quality Management Technical Guidance TG(22), updated 2022*
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) *Land Use Planning and Development Control: Planning for Air Quality (v1.2)*
Ministry of Housing, Communities & Local Government	Planning Practice Guidance: Air Quality, November 2019 National Planning Policy Framework (NPPF), July 2021
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps

5.2 Construction Phase

5.2.1 The proposed development consists of the conversion of 70 High Street and the addition of dormers. As the exterior construction work will be minimal, an assessment of dust from construction is not required.

5.2.2 Methods of best practice to minimise dust generation during the conversion should be implemented when relevant such as:

- Use enclosed chutes and covered skips;
- Minimise drop heights from loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Installation of construction building wrap with the exterior scaffolding;

- Use hoover dust collectors, as opposed to dry brushing;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate; and
- Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

5.3 Simple Air Quality Assessment

5.3.1 A simple assessment of air quality in terms of the impact of the development and suitability of the site, which relies on already published information, has been completed using sources such as the Local Authority's monitoring network and the Defra LAQM support tools.

6 Baseline Air Quality

6.1 Local Air Quality

6.1.1 Baseline air quality at the proposed development has been established by examining monitoring data produced by MCC (provided in the 2021 and 2020 Annual Status Report) and background concentration maps provided by Defra for the grid squares covering the proposed development.

6.1.2 The Greater Manchester AQMA has been declared based on the outputs of air dispersion modelling for the year 2016 at a height of 0 m. This modelling work was completed by Transport for Greater Manchester (TfGM). All locations across Greater Manchester that were predicted to be above a NO_2 annual mean of 35 µg/m^3 were declared as part of the AQMA. The annual mean objective is 40 µg/m^3 and the selection of 35 µg/m^3 as the threshold was selected to account for model uncertainty.

6.1.3 The site is located within the AQMA. The site location and its relationship to the AQMA is shown in **Appendix A**. A screenshot of the TfGM model outputs in the vicinity of the development site is shown in **Appendix B**. The modelling results for the year 2016 indicate that the NO_2 annual mean objective is exceeded along the high street but is below the annual mean objective along the minor roads. The development site is expected to be exposed to annual mean concentrations below the NO_2 short-term objective as the predicted concentrations are well below 60 µg/m^3.

6.2 Air Quality Monitoring

Nitrogen Dioxide (NO_2)

6.2.1 MCC monitors NO_2 utilising automatic monitoring stations and diffusion tubes. There is one automatic monitoring station, one set of triplicate diffusion tubes and an additional three diffusion tubes within 500 m of the proposed development site. The triplicate diffusion tubes are co-located with the automatic monitoring station.

6.2.2 The results from the diffusion tube are shown in **Table 3** and the monitor locations are shown in **Appendix A**.

Table 3: Annual Mean NO_2 Concentrations Monitored by MCC within the Study Area

Site ID (Classification)	Location		Annual Mean NO_2 Concentrations ($\mu g/m^3$)					
			2016	2017	2018	2019	2020	2021
MAN3 (Urban Centre)	384310	398337	**40**	36	35	36	27	30
MA61NO (Urban Background)			**40.8**	35.7	31.6	33.1	21.9	24.6
MA60NO (Urban Background)			38.0	36.3	32.1	32.6	22.6	24.6
MA59NO (Urban Background)			38.5	35.9	32.2	31.6	22.4	24.6
MA9ANO (Kerbside)	384601	398303	**51.9**	**51.1**	**45.8**	**44.9**	32.5	35.7
MA26ANO (Urban Background)	383973	398874	37.1	35.5	33.4	33.0	22.9	25.9
MA88NO (Kerbside)	384469	398981	**57.8**	**57.9**	**46.8**	**45.2**	30.1	36.8
Annual Mean NO_2 air quality objective								40 $\mu g/m^3$

6.2.3 The monitoring results in **Table 3** indicate that annual mean concentrations of NO_2 were below the NO_2 annual mean objective at the identified urban background monitoring sites during the period shown. The annual mean concentrations of NO_2 were above the NO_2 annual mean objective at the identified kerbside monitoring sites between 2017 - 2019.

6.2.4 During 2020 and 2021, the annual mean concentrations of NO_2 were below the NO_2 annual mean objective at all of the identified monitoring sites. However, in 2020, concentrations of NO_2 were affected by the Covid-19 lockdowns due to traffic reductions. As there were also Covid-19 lockdowns at the beginning of the year 2021, NO_2 concentrations may have been affected in 2021 as well.

6.2.5 The results indicate that the short-term objective for NO_2 was unlikely to be exceeded at the identified monitoring sites as monitored annual mean concentrations were well below the indicative screening concentration of 60 μ/gm^3 during the period shown.

Particulate Matter (PM_{10} & $PM_{2.5}$)

6.2.6 MCC monitors PM_{10} and $PM_{2.5}$ at the automatic monitoring station MAN3. The results from MAN3 are shown in **Table 4** and **Table 5** and its location is shown in **Appendix A**.

Table 4: Annual Mean PM_{10} Concentrations Monitored by MCC within the Study Area

Site ID & Classification	Location		Annual Mean PM_{10} Concentrations ($\mu g/m^3$)				
			2017	2018	2019	2020	2021
MAN3 (Urban Centre)	384310	398337	20	21	20	15	15
Annual Mean PM_{10} air quality objective							40 $\mu g/m^3$

Table 5: Annual Mean $PM_{2.5}$ Concentrations Monitored by MCC within the Study Area

Site ID & Classification	Location		Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)				
			2017	2018	2019	2020	2021
MAN3 (Urban Centre)	384310	398337	8	11	12	8	9
$PM_{2.5}$ Target Level							25 $\mu g/m^3$

6.2.7 Since 2017, the annual mean PM_{10} concentrations at MAN3 have been below the annual mean PM_{10} objective and concentrations of $PM_{2.5}$ at MAN3 have been below the annual mean target for $PM_{2.5}$.

6.3 Background Concentrations

6.3.1 Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development[6] are shown in **Table 6**.

Table 6: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site*

Grid Square	Pollutant	2023 ($\mu g/m^3$)
384500, 398500	NO_2	25.53
	PM_{10}	12.92
	$PM_{2.5}$	8.29

** Background concentrations obtained from the latest 2018 based background maps*

7 Effect of Air Quality on the Proposed Development

7.1 As discussed, due to the development being for hotel use, the annual mean air quality objectives do not apply to the development itself; however, the short-term objectives still apply[1].

7.2 The background concentrations in **Table 3**, **Table 4**, **Table 5** and **Table 6** show that background concentrations of NO_2 and PM_{10} are well below health-based air quality objectives of 40 $\mu g/m^3$ for both pollutants and $PM_{2.5}$ concentrations are well below the annual mean target for $PM_{2.5}$.

7.3 There are several monitoring sites within 500 m of the development site which give an indication of air quality within the vicinity of the development site. Since 2016, the short-term objective for NO_2 was unlikely to be exceeded at the identified monitoring sites as monitored annual mean concentrations were below the indicative screening concentration of 60 μ/gm^3 during the period shown.

7.4 The TfGM model screenshot in **Appendix B** shows that in 2016, at a height of 0 m, the development site was predicted to be exposed to annual mean concentrations below the NO_2 short-term objective as the predicted concentrations are well below 60 $\mu g/m^3$. As shown in **Table 3**, NO_2 concentrations within the study area have

[6] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

improved since 2016. Furthermore, all of the hotel accommodation rooms are situated on the first floor and above, the ground floor only houses stairs and a lift. As the concentration of primary pollutants, such as NO_2, decreases as the distance from the source increases, the ground floor is expected to be exposed to higher concentrations than the floors above.

7.5 The evidence from existing information sources is that the proposed development site is likely to experience levels of NO_2 and PM_{10} below the short-term objectives for the pollutants and below the annual mean target for $PM_{2.5}$.

8 Impact of the Proposed Development on Existing Air Quality

8.1 There is no car parking associated with the proposed development. Therefore, in accordance with EPUK and IAQM Guidance[2], there is not expected to be a significant risk of air quality change.

8.2 Any gas-fired boilers installed must meet a minimum standard of <40 mgNOx/kWh[2].

9 Summary of Impacts and Conclusion

9.1 This air quality report assesses the potential changes in air quality due to the proposed development and whether these potential changes would significantly alter air quality.

9.2 Concentrations of NO_2 and PM_{10} are likely to be below their respective short-term objectives at the proposed development site which is therefore considered suitable for its intended use with regards to air quality. Concentrations of $PM_{2.5}$ are expected to be below the annual mean target.

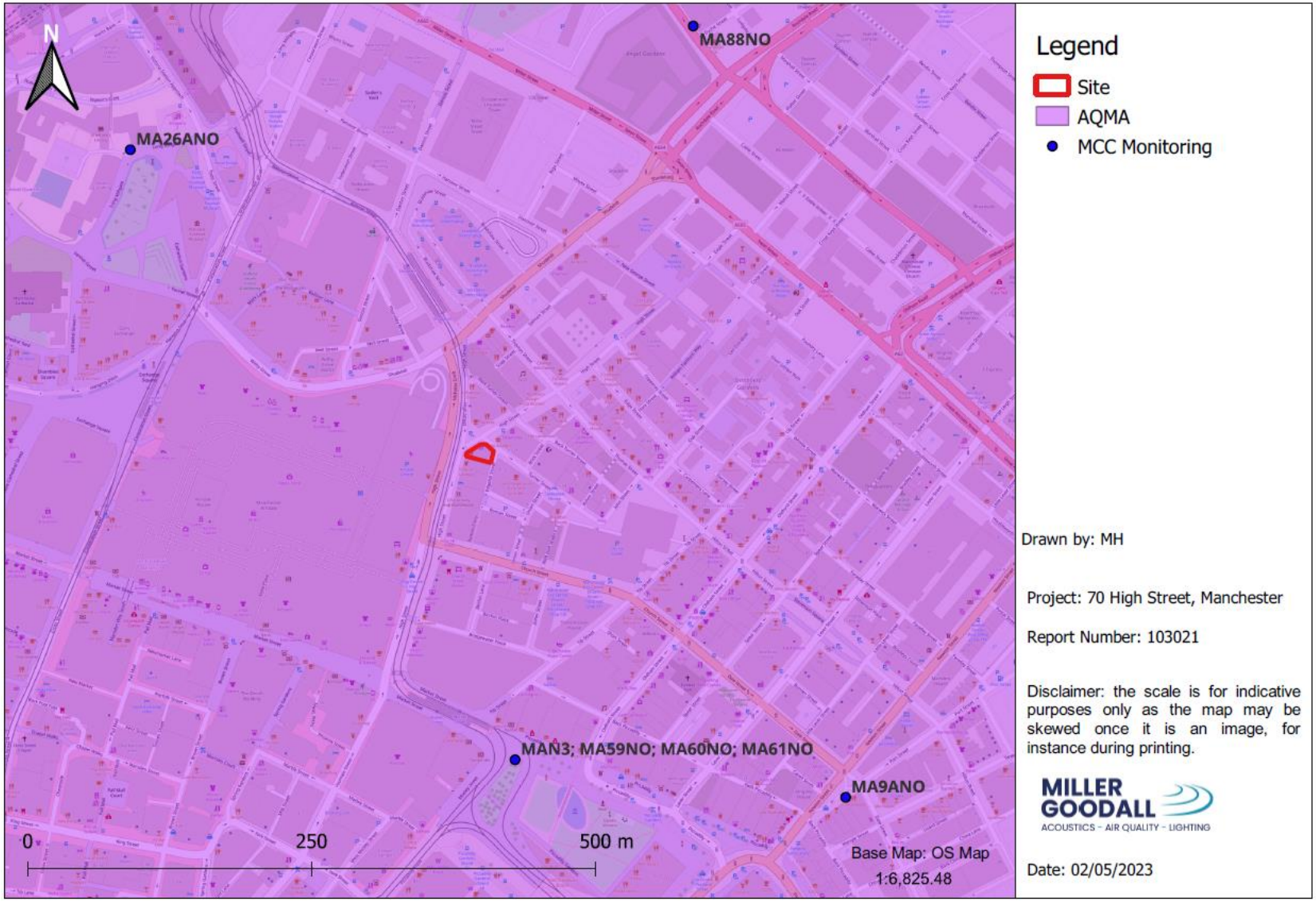
9.3 The proposed development is not expected to have a significant impact on local air quality.

9.4 There is, therefore, no reason for this application to be refused on the grounds of air quality.

APPENDICES

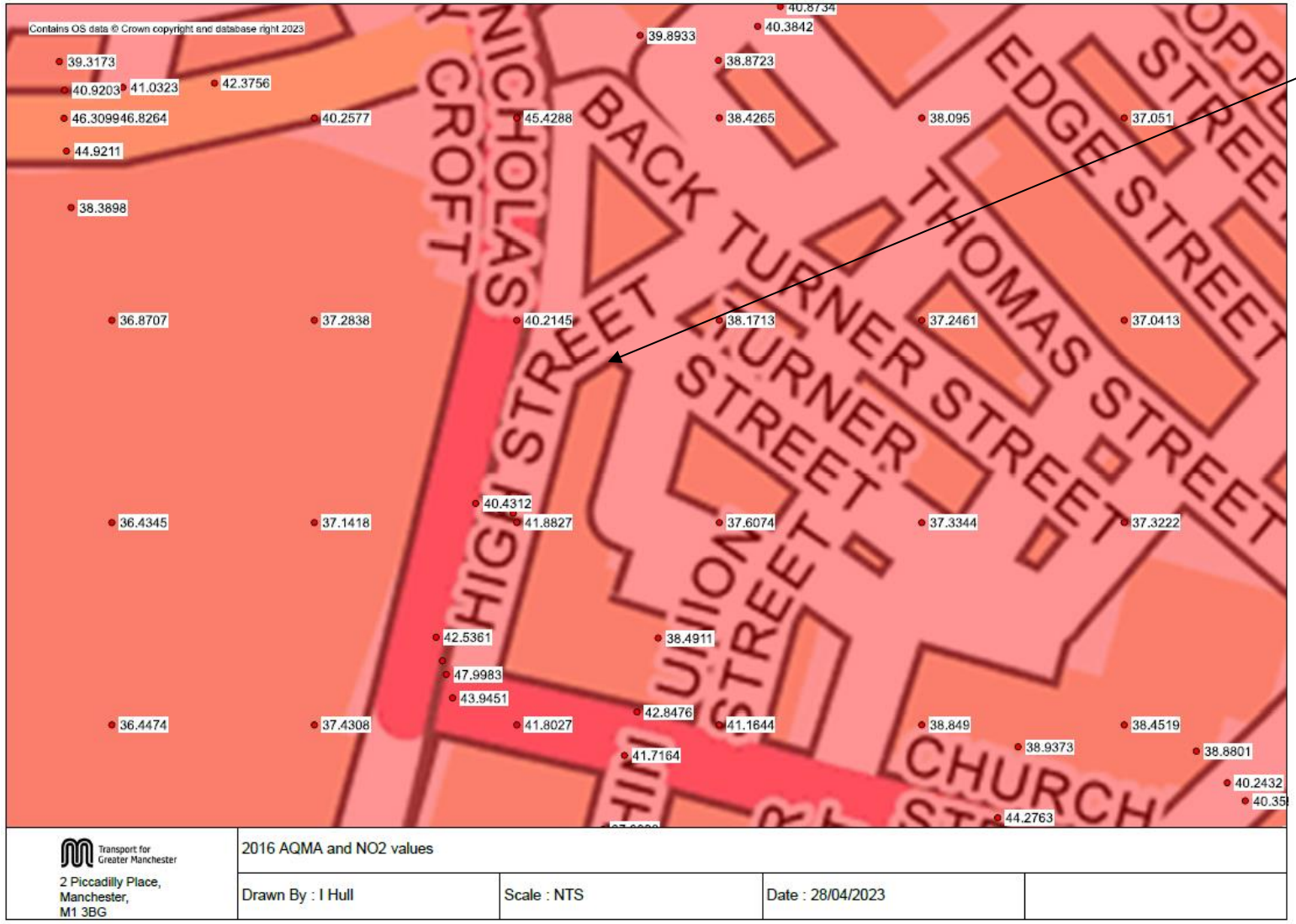
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Appendix A: Location of site, AQMA and MCC monitoring



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Appendix B: TfGM 2016 NO_2 Modelling Results of Study Area



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Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

(a) in the case of lead, the mean of the daily levels for that year;

(b) in the case of nitrogen dioxide, the mean of the hourly means for that year;

(c) in the case of PM_{10}, the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

AQS Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

Defra Department for Environment, Food and Rural Affairs

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or morality due to exposure to PM_{10} or $PM_{2.5}$ or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPUK Environmental Protection UK

HDV Heavy Duty Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDV Light Duty Vehicle

Mg/m^3 Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m^3 means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO_2 Nitrogen Dioxide

NOx A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO_2)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and us of his land.

Public nuisance, arising from and act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

$PM_{2.5}$ The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of $PM_{2.5}$, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

PM_{10} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{10}, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours


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