Deloitte.



# Project North Stand

## Environmental Statement: Volume 1

April 2023

# Contents

Appendices

Figures

1. Introduction 1

2. EIA Methodology 10

3. Alternatives and Design Evolution 17

4. Site Surroundings and Description of Proposals 23

5. Construction Methodology and Programme 28

6. Air Quality 44

7. Greenhouse Gas Emissions 77

8. Flood Risk and Drainage 103

9. Ground Conditions 140

10. Human Health 156

11. Noise and Vibration 176

12. Townscape and Visual Impact 202

13. Traffic and Transport 231

14. Wind Microclimate 260

15. Lighting 290

16. Socio-Economic 307

17. Summary of Residual Effects 327

18. Type 1 Cumulative Effects 341

Important notice: This Environmental Statement has been prepared by Deloitte, with technical input from Laing O'Rourke, SISK, Buro Happold, Enfusion, ME Engineers, Planit-ie, and Arup “the Consultants”. Chapter 1, Volume 1 of this Environmental Statement sets out the parties responsible for preparing each Chapter and associated figures and appendices.

Although we have read the Consultants’ reports for consistency and provide our observations based on our knowledge and experience, we accept no liability or responsibility for the Consultant’s Reports and will not be responsible for the technical content of Chapters 5-15, Volume 1, nor Volume 2, nor the technical content of the associated separate Non-Technical Summary.

# Appendices

## Introduction

No appendices

## EIA Methodology

Appendix 2.1. EIA Scoping Report

Appendix 2.2. EIA Scoping Response (dated 12 April 2023)

## Alternatives and Design Solution

No appendices

## Site, Surroundings and Description of Proposals

No appendices

## Construction Methodology and Programme

Appendix 5.1 Construction Management Plan – Laing O'Rourke

Appendix 5.2 Construction Management Plan and Method Statement – Sisk

## Air Quality

Appendix 6.1 Construction Assessment Methodology

Appendix 6.2 IAQM Assessment Criteria for Operational Impacts

Appendix 6.3 Traffic Data

Appendix 6.4 Model Verification

Appendix 6.5 Human Receptor Locations and Addresses

Appendix 6.6 Modelling Results - Construction

Appendix 6.7 Modelling Results - Operation

Appendix 6.8 Construction Mitigation

## Greenhouse Gas Emissions

Appendix 7.1 Greenhouse Gas Calculations

## Flood Risk and Drainage

Appendix 8.1: Flood Risk Assessment

Appendix 8.2: Drainage Strategy

## Ground Conditions

Appendix 9.1: Geo-Environmental Assessment

Appendix 9.2: Coal Mining Assessment

Appendix 9.3: Generic Qualitative Risk Assessment

Appendix 9.4: Groundwater Risk Assessment

Appendix 9.5: Factual Ground Investigation Report

## Human Health

No appendices

## Noise and Vibration

Appendix 11.1. National Planning Guidance Noise Hierarchy

Appendix 11.2. Construction Data

Appendix 11.3 Operational Road Traffic Data

Appendix 11.4 Noise Survey Results

Appendix 11.5 Construction Results

Appendix 11.6 Operational Road Traffic Results

## Townscape and Visual Impact

Appendix 12.1 Townscape and Visual Impact Methodology

Appendix 12.2. Viewshed Analysis

Appendix 12.3 Baseline Photography and Verified Views

## Traffic and Transport

Appendix 13.1: Transport Assessment

Appendix 13.2: Framework Travel Plan

Appendix 13.3: Scoping Correspondence

Appendix 13.4: Construction Traffic Data

Appendix 13.5: Modal Share

## Wind Microclimate

No appendices

## Lighting

Appendix 15.1 Lighting Assessment

## Socio-Economic

Appendix 16.1 Economic Impact Assessment

## Summary of Residual Effects

No appendices

## Type 1 Cumulative Effects

No appendices

# Figures

## Introduction

Figure 1.1:  Site Location Plan

## EIA Methodology

No Figures

## Alternatives and Design Solution

No Figures

## Site, Surroundings and Description of Proposals

Figure 4.1: Heritage Assets within 500m

## Construction Methodology and Programme

No Figures

## Air Quality

Figure 6.1: Wind rose from Manchester Airport meteorological station 2019

Figure 6.2: Location of proposed hotel relative to the AQMA

Figure 6.3: Air quality management areas in proximity to the Site

Figure 6.4: Local authority monitoring locations

Figure 6.5: Combustion plant proposed in Co-op Arena

Figure 6.6: Modelled human receptors and road layout

Figure 6.7: Construction context and surrounding receptors

## Climate Change

Figure 7.1: Diagram showing the stages of a lifecycle GHG emissions assessment. Diagram taken from LETI (2020) Embodied Carbon Primer, based on lifecycle stages set out in BS EN 1597:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method

Figure 7.2: Annual GHG emissions associated with operational energy over the 60-year design life of the Proposed Development

Figure 7.3: Cumulative operational energy GHG emissions over the 60-year design life of the Proposed Development

## Flood Risk and Drainage

Figure 8.1: The Site with red line boundary and key surrounding features

Figure 8.2: EA flood zone map, showing that The Site is located entirely within Flood Zone 1

Figure 8.3: Extent of flooding from rivers of the sea

Figure 8.4: EA risk of flooding from surface water

## Ground Conditions

No Figures

## Human Health

Figure 10.1: The Determinants of Health and Wellbeing (London HUDU developed from Barton & Grant 2007)

## Noise and Vibration

Figure 11.1: Locations of receptors used for assessment

Figure 11.2: Locations of noise monitoring positions

Figure 11.3: Event noise predictions: existing football match (noise levels at height of 1.5 m)

Figure 11.4: Event noise predictions: proposed football match (noise levels at height of 1.5 m)

Figure 11.5: Event noise predictions: existing concert (noise levels at height of 1.5 m)

Figure 11.6: Event noise predictions: proposed concert (noise levels at height of 1.5 m)

Figure 11.7: Event noise predictions: existing fan zone (noise levels at height of 1.5 m)

Figure 11.8: Event noise predictions: proposed fan zone (noise levels at height of 1.5 m)

## Townscape and Visual Impact

No Figures

## Traffic and Transport

Figure 13.1: Link Reference Plan

Figure 13.2: HGV Construction Traffic Routes

## Wind Microclimate

Figure 14.1: Existing Site and Proposed Development massing

Figure 14.2: Proposed landscaping plan

Figure 14.3: Site wind rose

Figure 14.4: Seasonal wind roses

Figure 14.5: Baseline: Comfort map summer. Concourse and Terrain

Figure 14.6: Baseline: Comfort map winter. Concourse and Terrain

Figure 14.7: Baseline: Safety map annual. Concourse and Terrain

Figure 14.8: Baseline: Comfort map summer. Seating and field of play

Figure 14.9: Baseline: Comfort map winter. Seating and field of play

Figure 14.9: Baseline: Comfort map winter. Seating and field of play

Figure 14.10: Baseline: Safety map annual. Seating and field of play

Figure 14.11: Proposed: Comfort map Summer. Concourse and Terrain

Figure 14.12: Proposed: Comfort map Winter. Concourse and Terrain

Figure 14.13: Proposed: Safety map Annual. Concourse and Terrain

Figure 14.14: Proposed: Comfort map Summer. Seating and field of play

Figure 14.15: Proposed: Comfort map Winter. Seating and field of play

Figure 14.16: Proposed: Safety map Annual. Seating and field of play

Figure 14.17: Proposed: Comfort map summer. Terraces

Figure 14.18: Proposed: Comfort map Winter. Terraces

Figure 14.19: Proposed: Safety map Annual. Terraces

## Lighting

Figure 15.1: External Lighting Treatments

Figure 15.2: Lighting Receptors

Figure 15.3: Lighting Survey Measurement Points

## Socio-Economic

No Figures

## Summary of Residual Effects

No Figures

## Type 1 Cumulative Effects

No Figures

# 1. Introduction

1.1. This Environmental Statement ('ES') accompanies an application for Full Planning Permission submitted to Manchester City Council (MCC) in respect of a Site at the Etihad Campus ("the Site" – Figure 1.1) for the extension of the Etihad Stadium North Stand alongside an expanded, covered 'City Square' and associated development components (comprising food and drink facilities, workspace, a new club shop and club museum plus a hotel) to support activity levels and the wider amenity offer of the Etihad Campus. (the "Proposed Development"). The application is submitted to Manchester City Council ('MCC') by Manchester City Football Club Ltd ('the Applicant').

## The Site

1.2. The Site is located in the Etihad Campus in East Manchester. It comprises 3.6 hectares and is bounded by Joe Mercer Way and the Etihad Campus Metrolink Stop to the north, the National Squash Centre to the west, and Alan Turing Way to the east. The remainder of the existing Etihad Stadium is to the south.

1.3. The Site encompasses the North Stand of the Etihad Stadium and the land immediately to the north which includes the structural supports for the Etihad Stadium, a fan zone with canopies and F&B provision, a club shop, hardstanding, and surface car parking to the east, some of which is currently occupied as a site compound for the construction of Co-op Live currently under construction to the north of the Ashton Canal.

1.4. The Site connects to Alan Turing Way to the east at an existing entry/egress point to the surface car park and site compound.

1.5. The Etihad Campus Tram Stop queue zones form part of the Site to the north, and the Site also includes a small section of landscaped land immediately adjacent to the National Squash Centre, which forms part of the Site to the West.

1.6. A servicing route loops around the Etihad Stadium, crossing the Site east to west. There are 16 sheffield cycle stands as existing.

1.7. Further details of the Site are set out in Chapter 4 of this Environmental Statement.

## The Proposals

1.8. The Proposed Development would provide a further £300m+ investment in East Manchester over the next 3 years, building upon the regeneration of the area witnessed over the last 30 years.

1.9. It comprises several interrelated elements that are collectively designed to create a best-in-class fan experience and year-round entertainment and leisure destination at the Etihad Stadium (the "Proposed Development"). These include:

- Expansion of the Etihad Stadium North Stand to provide an additional net capacity of 7,910 and an increase in the overall stadium capacity of up to 61,958 and noting that this capacity figure is within the ambit of an extant Planning Permission for expansion of the Stadium, including its north stand, which was granted in 2014.
- Associated hospitality and concourse facilities and an ancillary TV Studio.
- Creation of a roof walk attraction comprising walkways and platforms on the roof of the Etihad Stadium North Stand.
- A nine storey, 391-bed hotel, with a restaurant at Level 1 and a further 10 suites within the proposed expanded North Stand which are flexible for use as hotel or hospitality space.
- A further eight storey-building comprising:
    - A new club shop and ticket office at Ground Floor and First Floor;
    - A museum at Level 2 which links directly into the proposed North Stand;
    - An interactive visitor experience venue at Level 3; and,

- 4,000 sq. m. of workspace at Levels 4, 5, 6 and 7.

- City Square, a significant new covered outdoor fan zone and flexible event space located between the proposed hotel and the further eight-storey building, with year-round food and beverage (F&B) facilities provided at the ground and first floor of the proposed North Stand and interrelated adjoining buildings;
- Creation of new public realm, including the creation of a mix of both hard and soft landscaping, including places to sit and dwell alongside planters and trees; and
- Other associated works, including the creation of a new tree lined access road which will be provided to service the Proposed Development via an existing junction with Alan Turing Way, and a pick-up and drop-off area northeast of the hotel.

1.10. The description of the Proposed Development as detailed within the Application Form is as follows:

*"Alterations to the Etihad Stadium North Stand and adjoining land to provide an overall increase in Stadium capacity, hospitality, and concourse facilities available for use both during and outside of event days, an ancillary TV Studio (Sui Generis), a Roof-Walk Attraction (Use Class F1(c)) and the following 3 interrelated building components:*

1. *Construction of a new 9-storey 391 bed hotel (Class C1) with a further 10 suites provided within the North Stand of the Etihad Stadium for hotel or hospitality space (Class C1 / Sui Generis); and a restaurant at Level 1 (Class C1 / Class E).*
2. *Construction of an 8-storey building comprising: a new Club Shop and Ticket Office (Class E) at Ground and Level 1, City Museum at Level 2, Leisure Attraction at Level 3 (Class F1(c)); and workspace (Class E) at Levels 4, 5, 6 and 7.*
3. *A new covered City Square fan zone and flexible event space.*

*Ground Floor commercial, leisure, food and drink use (Class E and/ or drinking establishment (Sui Generis)) will be provided within each of the interrelated buildings adjoining the proposed square. The proposals include landscaping and public realm works, servicing and access arrangements, and other associated works."*

1.11. Accompanying the application for Planning Permission is an application for Consent to Display Advertisements. This covers proposals for three large LED screens, one on each of the gable ends of the hotel and commercial buildings, and a further screen proposed on the east elevation of the hotel building.

1.12. This ES sets out the findings of an Environmental Impact Assessment ('EIA') carried out in respect of the Proposed Development of the Site.

## Requirements for EIA

1.13. The EIA process is the mechanism by which development proposals are appraised in terms of their likely environmental effects, in addition to engineering and technical considerations.

1.14. The purpose of the EIA is to establish the nature of the Proposed Development and the environment in which it is likely to take place, during both construction and operational phases, as to identify the likely significant effects on the environment. The assessment compares the existing situation at the start of the work (baseline) with the situation during demolition, construction and operation.

1.15. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') require that any Proposed Development falling within the description of a 'Schedule 2 development' (as defined within the meaning of the EIA Regulations), will be subject to an EIA where such development is likely to have 'significant' effects on the environment by virtue of such factors as its nature, size or location (Regulations 2(b)).

1.16. The Proposed Development is considered likely to fall under the category of 'urban development projects' (Schedule 2, 10, (b)) where:

- The development includes more than 1 hectare of urban development which is not dwellinghouse development; or
- The development includes more than 150 dwellings; or
- The overall area of the development exceeds 5 hectares.

1.17. A formal EIA scoping request was submitted to Manchester City Council on 6 March 2023 requesting formal confirmation of the proposed scope of the Environmental Impact Assessment required in respect of the Proposed Development. A formal scoping opinion was received on 12 April 2023. The technical Chapters are based on a scope of assessment that has been agreed with the relevant statutory consultees through the scoping exercise. A copy of the Scoping Report and the Scoping Opinion is included in Appendix 2.1 and 2.2.

1.18. In accordance with the EIA Regulations, this ES sets out the following information:

- A description of the Proposed Development comprising information on the Site, design, size and other relevant features of the development;
- A description of the likely significant effects of the Proposed Development on the environment;
- A description of any features of the Proposed Development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by the developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A non-technical summary of the information, of the information specified above; and
- Any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

## Project Team

1.19. Deloitte has significant experience and expertise in managing the EIA process and hold the IEMA EIA Quality Mark. Details of the Project Team, EIA Technical Team and qualifications are set out in Table 1.1 and Table 1.2 below.

Table 1.1: Project Team and Technical Discipline

| Consultant | Technical Disciplines |
|---|---|
| Deloitte | Planning, Heritage, Socio-economic and EIA |
| Populous | Architecture and Design |
| Potential Contractor 1 | Construction Management |
| Potential Contractor 2 | Construction Management |
| Buro Happold | Daylight /Sunlight, Waste, Sustainability, Wind Microclimate, Flood Risk and Drainage, Air Quality, Noise and Vibration, Ground Conditions, Greenhouse Gas Emissions |
| SCS Technologies Ltd | TV/FM and DAB Reception Survey Report |
| ME Engineers | Lighting, Energy, BREEAM, Ventilation |
| Arup | Traffic and Transport |
| Helen Hamiliton Ecology | Ecology |
| Enfusion | Human Health |
| Planit-ie | Townscape and Visual Impact |
| Salford Archaeology | Archaeology |
| Greater Manchester Police | Crime and security |

Table 1.2: EIA Technical Team

| Topic | EIA Consultant | Qualifications |
|---|---|---|
| EIA Coordinator | Deloitte | PIEMA, MRTPI, MPlan, BA (Hons) |

| Topic | EIA Consultant | Qualifications |
|---|---|---|
| | | IEMA Quality Mark Registered |
| Air Quality and Dust | Buro Happold | Full Member of IAQM, Full Member of IES, Chartered Scientist (CSci), MSc Environmental Management, BSc Biology, BSc Environmental Science, |
| Greenhouse Gas Emissions | | BSc Geography, MSc Sustainability and Consultancy, MSc Climate Change<br>Member of IEMA |
| Water Quality, Drainage and Flood Risk | | BSc Geography, MSc Sustainability and Consultancy, MA (Hons) Architecture, MSc Environmental Management<br>Member of IEMA |
| Ground Conditions | | BSc (Hons) Geology, MSc Engineering Geology, Chartered Geologist (C.Geol), Specialist in Land Contamination (SiLC), Fellow of the Geological Society (FGS) |
| Noise and Vibration | | BSc Audio Technology, Member of the Institute of Acoustics (MIOA), MSc Environmental and Architectural Acoustics |
| Wind Microclimate | | PhD Mechanical Engineering. Treasurer of the Wind Engineering Society UK (WES) |
| Human Health | Enfusion | BSc MSc CEnv FIEMA<br>Fellow Membership of IEMA |
| Townscape and Visual Impact | Planit-ie | BA(Hons), Chartered Member of the Landscape Institute CMLI |
| Traffic and Transport | Arup | MEng (Hons) Civil Engineering, Chartered Civil Engineer (CEng) MICE. MCIHT, BA (Hons), MSc, MCIHT, MTPS<br>IEMA Quality Mark Registered |
| Lighting | ME Engineers | Bachelor of Architectural Engineering – Electrical/Lighting |
| Socio-economic | Deloitte | MRTPI, MPlan, BA (Hons) |

# EIA Scenarios

## Extant Planning Permission

1.20. The Site currently benefits from an extant consent (Ref. 105367/JO/2014/N2) for the expansion of the Etihad Stadium granted in 2014.

1.21. The 2014 Planning Permission comprised alterations to the Etihad Stadium, including increasing the overall height of the South and North stands and associated elevational alterations, to allow an increased stand capacity by up to 6,250 seats respectively and up to 2,000 additional pitch side seats creating a total match day capacity of up to 62,170 seats (from 47,670). It also included for the expansion of concourse facilities, alterations to the public realm including changes to car parking layout, landscaping, and boundary treatments as well as associated infrastructure works.

1.22. The Planning Permission included for the potential for both the North Stand and the South Stand to be delivered as one phase of construction, but also the scenario where construction of the South Stand would take place first (Phase 1), with the North Stand expansion (Phase 2) taking place at a later date.

1.23. The Applicant proceeded with the construction of Phase 1 first and the South Stand expansion works were completed in 2015. This included the construction of a third tier and roof to the South Stand, increasing capacity to up to 54,048.

1.24. As it stands, the South Stand expansion works (Phase 1) remains the only phase implemented since the approval of the previous Planning Permission and the North Stand remains unaffected. Nonetheless, Planning Permission Ref. 105367/JO/2014/N2 remains extant, and it would thus remain possible to implement Phase 2 of this Permission.

## Scenarios

1.25. The scenarios set out below will be tested for each technical discipline, which are based on the works described in paragraph 1.7.

1.26. The assessments are to be based on the following scenarios:

- Scenario 1 – baseline as existing today with committed developments;
- Scenario 2 – baseline as 2014 extant planning permission (qualitative assessment);
- Scenario 3 – baseline plus Proposed North Stand development; and,
- Scenario 4 – baseline plus Proposed North Stand development and mitigation.

1.27. It is considered the above scenarios provide a robust assessment. There are no committed developments within 500m of the Proposed Development site (the Co-op Live arena is to be assessed within the baseline as due for completion in December 2023); and therefore, to ensure a proportionate EIA, Scenario 1 includes the baseline and committed developments to negate the need for numerus scenarios in which the conclusions would be the same. There would therefore not be a scenario where if the committed developments did not come forward the conclusions of Scenario 1 would be impacted.

# Organisation of the Environmental Statement

1.28. This ES comprises 18 Chapters and is supported by figures (located at the back for each Chapter within Volume 1) and technical appendices (within a separate Volume 2). A non-technical summary (NTS) of the full ES is provided as a separate standalone document.

1.29. Figures have been referenced using the Chapter number as a prefix followed by the number of the figure within a given Chapter. Appendices have been referenced in the same way but due to their size they are contained separately in Volume 2. Table 1.3 sets out the structure of the ES.

Table 1.3: Structure of this Environmental Statement

| Chapter No. | Chapter Title | Description |
|---|---|---|
| VOLUME 1 | | Following Chapters |
| 1. | Introduction | Introduction to the ES, EIA requirements, details of the project team, ES organisation and availability. |
| 2. | EIA Methodology | Methods used to prepare each Chapter, description of ES structure and content, generic significance criteria, scoping and consultation. |
| 3. | Alternatives and Design Evolution | Outline of the main alternatives considered by the Applicant. |
| 4. | Site and Description of Development | Site description and details of the Proposed Development. |
| 5. | Construction Management – Programme and Methodology | Details of anticipated programme for development and construction methodology. |
| 6. | Air Quality and Dust | To assess the potential air quality impacts associated with the Proposed Development due to changes in traffic flows, construction etc. It also includes a cumulative assessment of impacts. |

| Chapter No. | Chapter Title | Description |
|---|---|---|
| 7. | Greenhouse Gas Emissions | To assess the nature and magnitude of Greenhouse Gas Emissions, which are likely to arise from the Proposed Development during construction and operation, and the impact of this contribution towards climate change. Mitigation measures required to minimise the contribution towards climate change. |
| 8. | Flood Risk and Drainage | To consider the potential impacts and likely effects of the Proposed Development on water resources and will assess flood risk and mitigation (including the use of SuDS). It will provide an overall justification in support of the scheme against the NPPF. |
| 9. | Ground Conditions | To assess the impact of the redevelopment of the Site on ground conditions. To include the identification of current ground conditions including potential contamination risks associated with the Site (including ground gas migration) and to assess how the redevelopment of the Site may affect current ground conditions which might have subsequent effects on sensitive receptors such as groundwater, future residents, site users, site construction workers and vegetation. |
| 10. | Human Health | To assess the likely significant effects of the Proposed Development on human health. |
| 11. | Noise and Vibration | To assess the likely significant effects of the Proposed Development in relation to noise and vibration. |
| 12. | Townscape and Visual Impact | To assess the likely significant effects of the Proposed Development in relation to townscape and visual impact. |
| 13. | Traffic and Transport | To consider the level of traffic to be generated and its potential impact on existing highways, accessibility to public transport and access / servicing requirements. |
| 14. | Wind Microclimate | To assess the likely significant effects of the Proposed Development in relation to environmental wind, in accordance with Policy EN2 of the Core Strategy and The Guide to Development in Manchester. |
| 15. | Lighting | To assess the likely significant effects of the Proposed Development on lighting with regard to the screens as part of the Proposed Development. |
| 16. | Socio Economic | To assess the likely socio-economic impacts of the Proposed Development upon the Site and surrounding area. |
| 17. | Summary of Cumulative Effects | Summary of residual effects of the Proposed Development (including cumulative impacts alongside other committed developments). |
| 18. | Type 1 Cumulative Effects | An assessment of the combined effects arising from the Proposed Development upon a set of defined sensitive receptors. |

| Chapter No. | Chapter Title | Description |
|---|---|---|
| VOLUME 2 | Technical Appendices | Technical data and reports to support the Chapters in Volume 1. |
| Non-Technical Summary | | A short concise document written in a non-technical language, necessary to meet the requirements of the EIA Regulations, to make the ES accessible to a non-technical audience. |

## Other Documents

1.30. Together with this ES and its appendices, the following documents will be submitted to MCC in support of the planning application:

Table 1.3: Planning Application Supporting Documents

| Document | Prepared by |
|---|---|
| Application Forms and Covering Letter | Deloitte |
| Site Location Plan | Populous |
| Full suite of existing and proposed plans, sections, and elevations, including landscaping plans and Accommodation Schedule | Populous |
| Design and Access Statement<br>(Including Signage Strategy and Landscaping and Public Realm Strategy) | Populous |
| Planning Statement and Executive Summary | Deloitte |
| Archaeological Desktop Report | Salford Archaeology |
| Archaeological Watching Brief | Salford Archaeology |
| Statement of Consultation | Deloitte |
| Crime Impact Statement | GMP |
| Crowd Modelling | Movement Strategies |
| Daylight/Sunlight Assessment | Buro Happold |
| Ecology including the Preliminary Ecological Assessment | Helen Hamilton Ecology |
| Heritage Statement | Deloitte |
| Operating Schedule / Event Management Strategy | Manchester City Football Club |
| Sustainability Statement<br>including the following technical appendices:<br>1. Green and Blue Infrastructure Statement<br>2. BREEAM Pre-Assessment<br>3. Energy Statement<br>4. Whole Life Carbon Assessment<br>5. Local Labour Agreement<br>6. Social Value Toolkit<br>7. Economic Impact Assessment | Buro Happold<br><br>Deloitte<br>ME Engineers<br>ME Engineers<br>ME Engineers<br>Manchester City Football Club<br>Deloitte<br>Amion |
| Topographical Survey | Survey Operations |

| Document | Prepared by |
|---|---|
| TV Reception Survey | ME Engineers |
| Ventilation, Extraction and Odour | ME Engineers |
| Waste Management Strategy | Buro Happold |

## Environmental Statement Availability

1.31. The ES is available for public viewing on Manchester City Council's Public Access website at the following address: http://pa.manchester.gov.uk/online-applications/ once the application has been submitted and validated.

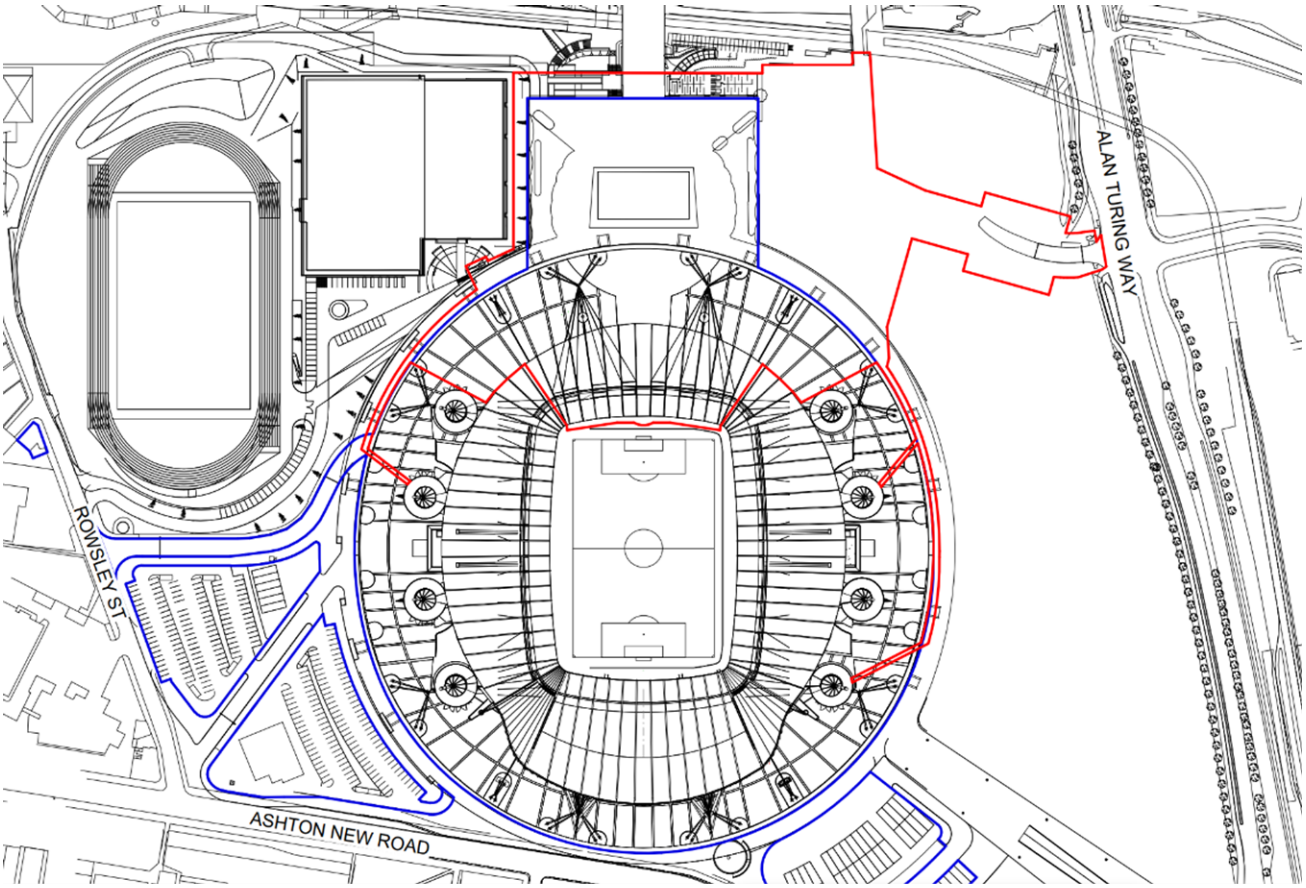
1.32. The ES may be purchased in volumes, the costs for which are set out below:

- Volume 1: ES Main Text and Figures - £150;
- Volume 2: ES Appendices - £150;
- Volume 3: Non-Technical Summary (NTS) - £15;
- Full Copy (Volumes 1 and 2, and NTS) of the ES on CD - £15.

1.33. For copies of any the above, please contact the Manchester Planning Team at Deloitte.

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# Figure 1.1 Site Location Plan



# 2. EIA Methodology

## Introduction

2.1. This Chapter sets out the methodology used to prepare each Chapter of the ES and describes its structure and content. In particular, it sets out the process of identifying and assessing the likely significant effects of the Proposed Development on the environment as defined in Chapter 1 and described in detail in Chapter 4.

## Legislation and Guidance

2.2. The ES has been prepared to comply with EIA Regulations, which implement European Council Directive No. 85/337/EEC as amended by Directive 2014/52/EU and entered into force on 17 May 2017. The EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies. The European Union (Withdrawal) Act 2018 introduced "retained EU law" which provides that EU-derived domestic legislation continues to have effect.

2.3. Reference has also been made to currently available good practice guidance in EIA including:

- Circular 02/99: Environmental Impact Assessment
- The European Commission's numerous EIA guidance documents available here: http://ec.europa.eu/environment/eia/eia-support.html
- Guidance on EIA Scoping, European Commission, June 2001
- Guidance on Transport Assessment, DCLG and DfT, March 2007
- National Planning Practice Guidance – Department for Communities and Local Government (March 2014 and continuously updated as a 'live' resource)

2.4. Reference has been made to the Institute of Environmental Management and Assessment (IEMA) publications, including:

- IEMA ES Review Criteria
- IEMA Guidelines for Environmental Impact Assessment (2004)
- IEMA Special Report into the State of Environmental Impact Assessment Practice in the UK (2011)
- IEMA Shaping Quality Development (2015)
- IEMA Delivering Quality Development (2016)
- IEMA Delivering a Proportionate EIA (2017)

2.5. The ES has also had regard to the National Planning Policy Framework 2021 (NPPF). The NPPF sets out the Government's economic, environmental and social planning policies for England, articulating the Government's aspiration for sustainable development. The NPPF has been considered where it is relevant to EIA.

- As relevant to the ES technical chapter's scope, methodology and assessment of effects, key local planning policy and guidance documents have been considered. These include:
- Manchester City Council Core Strategy (2012)
- Saved Unitary Development Plan Policies (1995)
- Any additional planning policy or guidance documents considered relevant have been identified within the relevant technical chapters.

## Screening and Scoping

2.6. A formal EIA Screening and Scoping request was submitted to Manchester City Council on 6 March 2023 (Appendix 2.1) requesting a formal opinion and confirmation as to the proposed scope of the Environmental Impact Assessment required in respect of the Proposed Development. A formal scoping opinion was received 12 April 2023 (Appendix 2.2).

2.7. The following Chapters have been scoped into the EIA:

- Air Quality;
- Greenhouse Gas Emissions;
- Flood Risk and Drainage;
- Ground Conditions;
- Human Health;
- Noise and Vibration;
- Townscape and Visual Impact;
- Traffic and Transport;
- Wind Microclimate; and,
- Lighting; and,
- Socio-economic.

2.8. The results of the scoping exercise have determined the subject areas of the EIA, as set out in Table 1.2.

## Consultation

2.9. The Proposed Development has been prepared in consultation with Manchester City Council and a range of technical stakeholders (refer to Table 2.1).

Table 2.1: Scope of Stakeholder Consultation

| Stakeholder Consultation |
|---|
| Manchester City Council Planning Authority |
| Manchester City Council Highways |
| Transport for Greater Manchester |
| Greater Manchester Archaeological Advisory Service |
| Manchester City Council Environmental Health Officers |
| Environment Agency |
| Greater Manchester Ecology Unit (GMEU) |
| Historic England |

2.10. In addition to the Stakeholder Consultation noted above, the proposals have benefited from two stages of public consultation. Further details are provided in the Statement of Consultation which accompanies the application.

## Non-Significant Effects

2.11. It has been confirmed via the Scoping opinion received by MCC on 12 April 2023 (Appendix 2.2) that the following disciplines will not give rise to likely significant effects on the environment and therefore do not require inclusion in the Environmental Statement. An explanation for each discipline is provided in the EIA Scoping Report in Appendix 2.1:

- Agricultural Circumstances;
- Aviation;
- Archaeology;
- Built Historic Environment;
- Daylight and Sunlight;
- Ecology; and,
- Electronic Interference.

## Approach to Technical Studies

2.12. Various technical studies were commenced at an early stage in the process. The findings of the baseline environmental studies played an important role in the design of the Proposed Development by defining the environmental sensitivities, constraints and opportunities associated with the Site.

2.13. Project team reviews, attended by members of the project team, were held throughout the pre-application process. These reviews provided a valuable forum for the exchange of information and ensured that the project team was fully aware of the environmental constraints and opportunities and of the interactions between disciplines. Pre-application engagement was also undertaken with Manchester City Council as the Local Planning and Highway Authority.

2.14. The technical studies have been undertaken in accordance with current best practice. Specific guidance used is referenced within each of the respective assessment Chapters.

2.15. The majority of assessments involved consultations with statutory and non-statutory bodies, desk-based research, Site inspections and surveys, impact prediction and mitigation.

2.16. The assessment and conclusions of the ES are based on the description of the Proposed Development provided in Chapter 4.

## Structure of Technical Chapters

2.17. Each technical Chapter of the ES has been set out broadly in line with Table 2.2.

Table 2.2: Structure of ES Technical Chapters

| Technical Chapter Subheading | Summary of information |
|---|---|
| Introduction | Each of the technical Chapters begins with an introduction providing context to the EIA completed. |
| Policy Context | This section includes a summary of legislation and of national and local policies relevant to the environmental discipline and explains its purpose in the context of the Proposed Development and the ES. |

| Technical Chapter Subheading | Summary of information |
|---|---|
| Assessment Methodology and Significance Criteria | This section describes the method or approach employed in the assessment of impacts, the criteria against which the significance of effects has been evaluated, the sources of information used and any technical difficulties encountered. Relevant legislation is also identified. |
| Baseline Conditions | This section describes and evaluates the baseline environmental conditions i.e. the current situation and anticipated changes over time assuming the Site remains unchanged. This is a critical part of the EIA process as it provides a measure against which potential environmental effects can be assessed. |
| Identification and Evaluation of Key Impacts | This section identifies the likely significant effects on the environment resulting from the Proposed Development. A description of the likely effects of the Proposed Development and an assessment of their predicted significance is provided.<br><br>The assessment of effect significance has been undertaken using appropriate national and international quality standards. Where no such standards exist, the judgments that underpin the attribution of significance are described. The guidelines, methods and techniques used in the process of determining significance of effects are contained within each of the technical Chapters presented. |
| Mitigation Measures | One of the main aims of the EIA process is to develop suitable mitigation measures to avoid, reduce or compensate for any significant adverse effects of a project.<br><br>This section of each technical Chapter describes the measures which would be implemented to mitigate potential adverse effects. Where possible, enhancement measures have also been proposed. |
| Cumulative Effects | This section considers the cumulative effects of the Proposed Development identified within the vicinity of the Site. Any likely significant effects on the environment arising in this respect are set out in this section.<br><br>There are two distinct types of cumulative effects:<br><br>Type 1 - Cumulative effects are the interactions between effects of the Proposed Development on a single receptor.<br><br>Type 2 - Cumulative effects are those that arise from incremental changes caused by other consented or reasonably foreseeable activities ('committed developments') together with the Proposed Development. |
| Residual Effects | The residual effects, i.e. the remaining effects of the Proposed Development assuming implementation of the proposed mitigation measures, have been estimated and presented.<br><br>The methods used to make these estimates are described and proposed methods of treatment for any residual effects have been identified and quantified where possible. |
| Summary | Each technical Chapter concludes with a brief summary outlining the potential residual effects of the Proposed Development. |

2.18. Chapter 5 provides information to allow the construction phase of the Proposed Development to be assessed by the disciplines set out in Chapter 1.

## Magnitude

2.19. The methodology for determining the scale, or magnitude, of effect is set out in Table 2.3.

Table 2.3: Methodology for Assessing Magnitude

| Magnitude of Impact | Criteria for Assessing Effect |
|---|---|
| Major | Total loss or major/substantial alteration to key elements/features of the baseline conditions such that the post development character/composition/attributes will be fundamentally changed. |
| Moderate | Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed. |
| Minor | A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character / composition / attributes of the baseline condition will be similar to the pre-development circumstances/situation. |
| Negligible | Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation. |

## Sensitivity

2.20. The sensitivity of a receptor is based upon the relative importance of the receptor using the scale in Table 2.4.

Table 2.4: Methodology for Assessing Sensitivity

| Sensitivity | Examples of Receptor |
|---|---|
| High | The receptor/resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance. |
| Medium | The receptor/resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance. |
| Low | The receptor/resource is tolerant of change without detriment to its character, is of low or local importance. |

## Significance

2.21. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. Table 2.5 below shows how magnitude and sensitivity interact to derive effect significance.

Table 2.5: Methodology for Assessing Significance

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Medium | Low |
| Major | Major Adverse/Beneficial | Major - Moderate Adverse/Beneficial | Moderate - Minor Adverse/Beneficial |
| Moderate | Major - Moderate Adverse/Beneficial | Moderate - Minor Adverse/Beneficial | Minor Adverse/Beneficial |
| Minor | Moderate - Minor Adverse/Beneficial | Minor Adverse/Beneficial | Minor - Negligible |
| Negligible | Negligible | Negligible | Negligible |

2.22. The above magnitude and significance criteria have been provided as a guide for technical specialists to assess impact significance. Where discipline specific methodology has been applied that differs from the generic criteria above, this has been clearly explained within the given Chapter under the heading of 'Assessment Methodology and Significance Criteria'.

2.23. For the purposes of this Environmental Statement, an effect will be potentially 'significant' if it is classed as either 'moderate' or 'major' (bold text in Table 2.5).

## Baseline Conditions

2.24. Each technical Chapter includes a section which describes and evaluates the baseline environmental conditions (i.e. the current situation and anticipated changes over time assuming the Site remains unchanged). Baseline data has been obtained from a variety of sources, including published documents, maps, historical information and Site survey data. Given the complex nature of the Site and surroundings, each technical Chapter (Chapters 6 to 14) includes a clear description of what is assumed as the baseline against which the assessment is being made.

2.25. The method used to obtain baseline information, where relevant and possible, has been clearly identified within each technical Chapter and agreed in advance with statutory consultees.

## Mitigation

2.26. Any adverse environmental effects have been considered for mitigation at the design stage and, where practicable, specific measures have been put forward. Measures have been considered based on the following hierarchy of mitigation:

- Avoidance;
- Reduction;
- Compensation;
- Remediation;
- Enhancement.

2.27. Where the effectiveness of the mitigation proposed has been considered uncertain, or where it depends upon assumptions of operating procedures, data and/or professional judgement has been introduced to support these assumptions.

2.28. Mitigation recommended during the construction phase would be set out in the Construction Management Plan (CMP) to be agreed with MCC prior to the commencement of work and implemented throughout the duration of the works. Outline mitigation measures to be included in a future CMP are set out in Chapter 5: Construction Methodology and Programme.

2.29. Mitigation to be implemented during the operational phase would be secured through planning conditions and obligations.

## Residual Effects

2.30. The likely significant effects on the environment, assuming the successful implementation of mitigation measures proposed, have been estimated within each Chapter. These are termed 'residual effects' and are considered in Chapter 15 of this Statement.

## Cumulative Effects

2.31. The ES considers the potential for likely significant effects on the environment resulting from consented or reasonably foreseeable activities or developments in the area, which could lead to potentially significant cumulative effects in conjunction with the Proposed Development ('Committed Developments').

2.32. A search of Manchester City Council's planning applications database and knowledge of the area has identified a number of schemes for which cumulative effects are considered more likely. A full list, as of January 2023 is contained within the Scoping Report at Appendix 2.1, to which agreement has been provided from the Local Planning Authority as part of the Scoping Opinion process.

2.33. Each technical Chapter (Chapters 6-14) has assessed the potential for likely significant effects on the environment, as a result of the above committed developments, together with the Proposed Development.

2.34. In addition, Chapter 16 assesses the Type 1 Cumulative effects.

## Assumptions and Limitations

2.35. The principal assumptions that have been made and any limitations that have been identified in preparing the ES are set out in each technical Chapter. General assumptions include the following:

- All of the principal land uses adjoining the Site remain. Where redevelopment proposals have been granted Planning Permission, the effect of those proposals are considered as part of the Cumulative Impacts as part of Scenario 1 as noted within paragraph 1.20;
- Information received from third parties is complete and up to date;
- The various stages of the Proposed Development will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge;
- Assessments are based upon, and conclude, the 'worst case' effects that would arise from the application as defined by the description of development set out in Chapter 4, Site Surroundings and Description of the Proposals;
- Construction and demolition methods and phasing will follow the timetable and methods set out in Chapter 5, Construction Management;
- Conditions will be attached to the Planning Permission that will control disturbance during the Proposed Development; and,
- Necessary off-site services infrastructures for the Proposed Development will be provided by statutory undertakers.

## Objectivity

2.36. The technical studies undertaken with the ES have been progressed in a transparent, impartial and unbiased way with equal weight attached, as appropriate, to beneficial and adverse effects. Where possible, this has been based upon quantitative and accepted criteria together with the use of value judgements and expert interpretations.

2.37. The assessment has been explicit in recognising areas of limitation within the ES and any difficulties that have been encountered, including assumptions upon which the assessments are based. Where appropriate, the assessment of significance has been given confidence levels.

# 3. Alternatives and Design Evolution

## Introduction

3.1. Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations requires the Applicant to provide an outline of the main alternatives studied and an indication of the main reasons for the choice made, considering the environmental effects. Additionally, Schedule 4, Paragraph 2 of the EIA Regulations1 states that an ES should include: 'a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'.

3.2. In considering the evolution of the Proposed Development, all aspects have been evaluated in response to a number of longstanding strategic objectives and established principles, embedded in local planning policy and guidance as well as within the suite of planning applications and major development proposals that have come forward at the Etihad Campus to date. These principles are designed to create a world class proposition. They were reconsulted upon during December 2022, and are set out below:

1. New employment opportunities arising from the North Stand Development must be accessible to East Manchester residents in particular and also support the retention and attraction of talent to the city.
2. The Proposed Development must deliver improved social and economic outcomes through specific implementation plans.
3. The iconic Etihad Campus anchor, the Etihad Stadium, should be the catalyst for the expansion of a world-class sports and entertainment destination and the creation of a global exemplar.
4. The Proposed Development must be entirely distinctive in its offering, and only capable of being located at the Etihad Campus.
5. The Proposed Development must fundamentally accord with the Etihad Campus Strategic Sustainability Framework 2020, and actively contribute towards CFG's stated intention to be net zero carbon by 2030 and crucially therefore to MCC's aim to be net zero carbon by 2038.
6. The Proposed Development fully addresses the Etihad Campus Strategic Vision for Movement and Transport, whilst creating the conditions whereby dwell times on match days are increased, both pre- and post-game, smoothing out peak travel flows and demands on the transport network.
7. The Proposed Development will create a distinctive sense of place.

3.3. This Chapter considers the following four options in the context of these requirements and the existing Development Brief:

- The 'do nothing' alternative where the Proposed Development is not progressed.
- Alternative Locations for the Proposed Developments.
- Alternative Technologies.
- Alternative Designs (including size and scale) for the Proposed Development.

## The "do nothing" Alternative

3.4. The "do nothing" scenario refers to the option of leaving the Site in its current use as home to the existing Etihad Stadium North Stand and existing City Square, retail and F&B offerings, and structural support of the Etihad Stadium.

3.5. The area has been identified as a key regeneration priority by the City Council, with the New East Manchester Corporation Ltd being formed in 1999 to guide the regeneration of the area ahead of the Commonwealth Games in

2002. Subsequently a number of regeneration initiatives have looked to build upon the success of the Commonwealth Games, first as the City of Manchester Arena and then as the home-ground of Manchester City Football Club.

3.6. Since 2002, the Etihad Stadium has been the beacon of regeneration for East Manchester. The pace of economic growth within Manchester over the last ten years along with the ongoing investment from the City Council, the Abu Dhabi United Group and other partners, such as Sport England, has strengthened the focus of the Etihad Stadium and its environs as a focus for new investment and job growth in East Manchester.

3.7. This has included the delivery of the City Football Academy, which transformed 75 acres of reclaimed former industrial land into the world's leading training ground and one of the world's best elite performance facilities. Together with the expanded Etihad Campus' existing array of sports and community facilities, the project has delivered jobs and training opportunities for local residents and a new community hub incorporating sports and education facilities, in addition to the Manchester Institute of Health and Performance (MIHP), which is a world-class centre for scientific research, analysis and treatment.

3.8. Central to the long term vision for the Etihad Campus and the wider area has been the ambition to establish it as a place to drive forward the development of a globally competitive sport, leisure and recreation offer. Over the last 15 years the loss of the opportunity for Manchester to host the first Regional Casino, aligned with the deep economic recession of 2008 and 2009, thwarted any opportunity for the Etihad Campus to fulfil that long term ambition to host a globally competitive leisure and recreation offer.

3.9. In planning policy terms, the Site was identified in Manchester's UDP (1995) – Sub Area 7 – Sportcity Saved Policy EM11 as: "*a major focus for regeneration activity on previously developed land. It is located in a strategic position at the heart of East Manchester with excellent infrastructure and proposed infrastructure links to the City Centre, adjacent areas and the national motorway network."* It goes on to state that: "*the area fronting the Alan Turing Way is suitable for a mix of uses including a hotel, leisure and other commercial uses."*

3.10. In MCC's Manchester Core Strategy 2012 it is set out that East Manchester remains a major economic driver and centre of employment for the City and the conurbations and has a number of key advantages including good vehicle access, good public transport linkages and the availability of large flexible sites.

3.11. Core Strategy Policy EC7 specifically identifies the Etihad Campus as a location "suitable for a major sports and leisure visitor destination with complementary commercial, retail and hotels." The vision is to broaden the activities in the area to ensure development opportunities secure the wider regeneration of the surrounding area and deliver maximum benefits for the community. Although it is anticipated further sites will come forward over the plan period, currently there are two sites which are identified as a focus for development.

3.12. Out of the two sites, the Site comprises 'Land around the City of Manchester Stadium, including the "Collar Site" to the east and further land to the north and west'. The Policy reads:

*"The "Collar Site" provides an opportunity for a leisure, recreation and entertainment visitor attraction of national significance. A landmark design will be key to delivering such a prestigious development which, together with the existing developments within Eastlands, will not only provide a sense of place but will also ensure integration with the surrounding community. Developments that are predominantly tourism / leisure based, including hotels and food and drink will be appropriate together with ancillary retail required to support the principal uses. On development sites to the north and west of the stadium, development of complementary commercial uses will be supported, particularly to accommodate economic activities associated with the growth of Manchester City Football Club."*

3.13. The Council's ambitions to develop the Site is further stated in the Eastlands Regeneration Framework ('ERF') where the Site is identified as being situated in the 'Etihad Campus', as a place to drive forward the development of a globally competitive sport, leisure and recreation offer.

3.14. The "do nothing" scenario has been discounted due to the long-established aspiration to turning the Etihad Campus into a beacon of regeneration and an all year round visitor destination of national significance. The "do nothing" alternative option would not deliver on the long standing development plan objectives that are further supported by other material considerations, nor will it secure the best and long-term viability of the Etihad Campus and achieve the overall strategic objectives of the city council.

3.15. Manchester City Football Club's sustained success on the pitch over a number of years has created significant growth in the Manchester City Football Club fanbase, which is predicted to keep growing year on year. There is a requirement therefore to ensure that the Etihad Stadium is keeping pace with this increasing fanbase and associated growth in ticket demand and fan expectations. The Etihad Stadium is fundamentally the platform for driving wider change

across the area. Investment in Manchester City Football Club's facilities ensures that it can continue to perform this role to its maximum potential, keeping Manchester City Football Club operating in the best way for Manchester and in line with its peers in international football, many of whom are also considering major investments in their own stadia and the capacity for further added value uses in recognition of the role that such significant infrastructure can play in the creation of value and in supporting public benefits across a broad range of environmental, social and economic objectives. Indeed, if starting again, it could be argued that any organisation looking at the design for a new stadium would be including wider uses, rather than just a stadium used solely on match days and therefore intermittently throughout the year. Maximising the use of major new stadia and their capacity to support inclusive growth and regeneration objectives, particularly where they are supported by significant levels of sustainable transport infrastructure as is the case at the Etihad Campus, is an inherently sustainable proposition.

3.16. The Etihad Campus is part of the Regional Centre, and the economic success of the Campus is key to the long term success of Manchester City Centre. The future success of the Campus is centred around it becoming a world class entertainment district anchored by the Stadium and a range of other sports, leisure and entertainment facilities.

3.17. The Proposed Development will bring further and more regular footfall and activity to the Campus, not only during match-days but as an all year-round visitor destination. It will boost economic and social activity within the area, delivering an unique opportunity for the Campus to develop its employment base (to provide new employment opportunities, which are accessible to East Manchester residents in particular, and also support the wider retention and attraction of talent to the city) and to create a visitor infrastructure to meet these distinctive demands, which capitalises on the Site's excellent public transport accessibility, its existing facilities and the strength of its existing occupier base, in particular MCFC and CFG, the latter being a global business with global reach and significant investment capability headquartered in East Manchester.

3.18. Fundamentally, the Proposed Development delivers on long standing development plan objectives that are further supported by other material considerations. In the "do nothing" scenario, there would be a clear missed opportunity to build on these existing strengths to deliver the social and economic benefits and catalyse future development at the Campus.

## Alternative Locations

3.19. Alternative sites have not been considered as the Proposed Development is for the extension of the Etihad Stadium together with a series of inextricably interrelated uses, each reliant on the Etihad Stadium as their fundamental platform for growth, that could not therefore be located on any other Site. Additionally, there are no other suitable locations within the Applicant's control.

3.20. Building on the significant progress to date, the Proposed Development will enhance the Etihad Campus as a location with a unique combination of major sports uses and as leisure visitor destination of national significance, building upon the forthcoming completion of Coop Live, by providing additional commercial, retail, and hotel offerings that are key ingredients in the formation of a year-round world-class sports and entertainment destination, and which will act as a catalyst to the future success of the Campus. This would not be achieved in an alternative location.

3.21. Therefore, the "alternative location" scenario has been discounted.

## Alternative Technologies

3.22. The complexity and costs sensitive nature of the Proposed Development's construction phase, as a stadium expansion and associated mixed use development, means that the use of alternative technologies is primarily influenced by issues of cost and buildability issues, rather than environmentally focused considerations. Energy strategy technologies have been considered and will continue to be considered as part of the proposed development. They are referenced within the supporting Sustainability Statement, in the context of meeting Manchester City Football Club's own Sustainability aspirations as well as broader policy and regulatory requirements, rather than in connection with the process of assessing alternative environmental effects. On this basis 'Alternative Technologies' are not considered to be applicable.

## Alternative Uses

3.23. In planning policy terms, the Site is already identified in Manchester's Unitary Development Plan (1995) – Sub Area 7 – Sportcity Saved Policy EM11 as: "a major focus for regeneration activity on previously developed land. It is located in a strategic position at the heart of East Manchester with excellent infrastructure and proposed infrastructure links to

the City Centre, adjacent areas and the national motorway network." It goes on to state that: "the area fronting the Alan Turing Way is suitable for a mix of uses including a hotel, leisure and other commercial uses."

3.24. Manchester's Core Strategy (2012) builds on this by identifying the Etihad Campus as a location "suitable for a major sports and leisure visitor destination with complementary commercial, retail and hotels." It outlines the requirements of new development at the Eastlands Strategic Employment Location within Core Strategy Policy EC7: to broaden the activities in the area to ensure development opportunities secure the wider regeneration of the surrounding area and deliver maximum benefits for the community.

3.25. Further to the adopted Core Strategy, the 2017 ERF specifically identified the Site as being in an area where development should encourage activity all-year round through uses such as retail and hotels and uses which may also serve the evening economy. The ERF identified part of the Site as being in an area where additional office space is needed and shape the area as a conglomerate of businesses of similar sports nature. Another objective identified for the Site is to diversify the pattern of uses of the Etihad Campus, by creating a wider profile of activity day by day and all the year round.

3.26. The Applicant's overall proposition is set to create an agglomeration of outstanding facilities that are intended to be owned and operated by City Football Group which in itself is a major global organisation headquartered in East Manchester. They will offer a unique set of experiences that are distinctive to the Etihad Campus, supporting its long-term success as a major destination centre. The Applicant also aims to significantly improve the fan experience and, in creating a destination that appeals to a broad audience on both match and non-match days. It will enliven the Etihad Campus all-year round, offering a unique set of experiences that are distinctive to the Etihad Campus and which support its long-term success as a major destination centre in line with local Planning Policy and the Eastlands Strategic Regeneration Framework.

3.27. The proposed uses are therefore considered appropriate for the Site in the context of the local planning policy framework and therefore no alternative uses have been assessed as part of this Environmental Statement.

## Alternative Designs

3.28. The design of the Proposed Scheme has evolved in consideration of the framework evaluation principles identified at the outset of this Chapter, along with the extensive process of ongoing stakeholder consultation, market assessments and technical due diligence including environmental studies. During this design process, 'alternatives' have been considered and disregarded.

3.29. Manchester City Football Club competes in the Premier League and the UEFA Champions League; the top-flight of English and European football respectively and has seen considerable success since Abu Dhabi United Group's investment in the Club in 2008. Manchester City Football Club have won the Premier League six times since, in addition to other domestic trophies, including the FA Cup in 2011, the FA Community Shield, EFL Cup and FA Cup in 2019. The success on the pitch has created significant growth over the years in the Manchester City Football Club fanbase which is predicted to keep growing year on year. There is therefore a requirement to ensure that the Etihad Stadium is keeping pace with the increasing fanbase and associated growing ticket demand and fan expectations.

3.30. The Etihad Stadium is fundamentally the platform for driving wider change across the area. Investment in Manchester City Football Club's facilities ensures that it can continue to perform this role to its maximum potential, keeping Manchester City Football Club operating in the best way for Manchester and in line with its peers in international football, many of whom are currently making major investments in their own stadia in recognition of the role that such significant infrastructure can play in supporting wider beneficial uses and the creation of value.

3.31. The project brief was for a unique and effective architectural design that responds to and integrates with the site parameters, local environment, city cultural context and will continue to build on the club's ethos for sustainable development. It needs to respond to a number of strategic objectives designed to create a world class proposition, aligning to the long-established framework principles for the Etihad Campus including actively contribute towards CFG's stated intention to be net zero carbon by 2030, addressing the Etihad Campus Strategic Vision for Movement and Transport, whilst creating the conditions whereby dwell times on match days are increased, both pre- and post-game, and creating a distinctive sense of place.

3.32. A wide range of specialist consultants and other stakeholders have provided valuable input into the Proposed Development, informing the design process and assisting the team in arriving at an appropriate solution for the Site.

3.33. The Applicant has developed a distinctive North Stand Development proposition that will affirm the Etihad Campus' positioning as an icon of global excellence in sports and entertainment, where all Manchester residents can share in its success. It has carefully examined its fan and amenity offering and identified where it can create new opportunities for work and leisure provision, leveraging its enormous brand power, that simply cannot be provided anywhere else.

3.34. Against this context, the Design and Access Statement prepared in support of the planning application proposals identifies a number of key factors the initial project brief that were pertinent to the proposed design:

- A compact and efficient design response that respects the surrounding sport and entertainment Campus parameters, and the existing neighbourhood residential and commercial activities, in the context of a compact site.
- To become a landmark for the campus, with an identity that acknowledges Manchester's rich heritage of manufacture trade and export, whilst bringing new opportunity and energy into the life of the Campus and the Football Club.
- A design that carefully integrates with the Campus and therefore requiring a sensitive approach to merging the venue's hard and soft landscaped approaches to existing routes, creating new dwell spaces and activation opportunities where they take best advantage of aspect, outlook and connectivity.
- Identifying opportunities to develop additional uses for the facilities that support the developing sports and entertainment campus, to create more activity and improve visitor experience.

3.35. The stadium was first built for the 2002 Commonwealth Games and shortly after was converted to a football stadium. The stadium was then expanded following the 2014 consent with regard to the South Stand. As part of the 2014 planning permission, a symmetrical North Stand was proposed however this has not been built. The Proposed Development has evolved into another iteration of the North Stand with an increased capacity compared to the South Stand extension, as well as a commercial and hotel offer, alongside the revamped City Square to provide a year round leisure and entertainment location that supports the continued regeneration of the Etihad Campus and East Manchester.

3.36. Other elements of the Proposed Design that have evolved in response to the design brief, and the process of consultation and assessments include:

- Adjacent to the North Stand, the proposals have been designed to deliver ground floor activation including the club shop and museum and various hospitality offerings. A workspace block is stacked on top of the retail and museum block and a T-shaped hotel is added on top of the hospitality block. The entrance to the hotel is separated from City Square and located on the north east of the site. The two block masses are then kinked inwards to create a sense of enclosure to City Square and introduce a more engaging approach from Joe Mercer Way.
- The massing of the four main elements of the scheme, the Stadium, Hotel, Commercial block and City Square has been developed to respect the Etihad Stadium and the scale of the surroundings, whilst providing an exciting addition to the Etihad Campus.
- The proposed scale of the North Stand respects the surrounding buildings, the residential blocks to the east and the new Arena to the north. The scale has also been designed to respect the size of the South Stand, although the iconic masts of the new North Stand are taller than those of the South Stand.
- The arrival experience of each visitor has been a major influence on the design of the venue. During match-day the primary arrival points are the tram stop, Joe Mercer Way and the ring road around the Stadium. City Square is the main intersection between these three arrival points and therefore becomes the key frontage of the building. City Square will primarily be a space offering hospitality on a match-day and accessible to the general public every day.
- On non-match-days, City Square will be activated by the general public, visiting other venues on the Campus or simply enjoying the facilities. City Square sits at the intersection of numerous pedestrian routes. The Ring Road around the stadium also acts as a route for service vehicles. The Hotel will be serviced via the new access road from Alan Turing Way.
- During the Design and Planning process, consultation has taken place with Greater Manchester Police, including the Counter Terrorism Unit. Recommendations have been taken on board accordingly:

- The landscaping and building massing have been designed to create open and highly visible spaces and also reduce blind spots.
- The lighting for the scheme has also been designed carefully to avoid dark and shadowy areas.
- High levels of finishes and materials specified within the development, will promote a sense of ownership amongst the visitors, helping with public safety and making vandalism less likely. New well-lit and covered cycle parking is proposed to the south east of the stadium.
- New clear signage is proposed to aid visitors around the site with its design to be in keeping with the current signage design.
- Use of shared surfaces, traffic control measures and security at the entrance to the site have been implemented to manage the interface between pedestrians and vehicles and help reduce vehicle related crime.

3.37. The Design and Access Statement, prepared by Populous, which accompanies this application addresses the design evolution of the Proposed Development in further detail.

3.38. The proposals brought forward are of the highest architectural quality. An extensive team of the world's leading stadium designers have been brought together to deliver world-class development proposals for Manchester. The facilities aim to be the best in class across all areas of the design to deliver unique experiences for everyone who visits the venue.

## Summary

3.39. Where possible, alternative options have been considered throughout the design process. The above has set out why the Site is considered suitable for the Proposed Development.

3.40. The Proposed Development delivers on the vision for the Etihad Campus as set out within UDP Saved Policy EM11, Core Strategy Policy EC7, and within the ERF (2017). Building on the significant progress to date and that to be realised in 2023 through the completion of Co-op Live, the Proposed Development enhances the Etihad Campus' reputation as a sports and leisure visitor destination of national significance, providing supplementary commercial, retail, and hotel offerings that will act as a catalyst for the expansion of a year-round world-class sports and entertainment destination.

3.41. The Proposed Development presents a unique case of uses at the Etihad Campus that are entirely distinctive in their offering and which are essential for the success of the Etihad Campus and East Manchester. The Proposed Development will significantly improve the fan experience and, in creating a destination that appeals to a broad audience on both match and non-match days, it will enliven the Etihad Campus all-year round.

3.42. The Proposed Development has also been influenced by pre-application consultation with key stakeholders including local landowners, residents, businesses, statutory consultees, as well as with MCC.

3.43. Throughout this design process, environmental constraints and opportunities have been considered from the outset to arrive at the most appropriate solution for the Proposed Development. On this basis, Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations has been addressed.

# 4. Site Surroundings and Description of Proposals

4.1. This Chapter includes a description of the Site, its surrounding context, a more detailed description of the Proposed Development.

## Site Description

4.2. The Site comprises 3.5 hectares and is located at the heart of the Etihad Campus in East Manchester.

4.3. It encompasses the North Stand of the Etihad Stadium and the land immediately to the north.

4.4. The land immediately to the north of the Etihad Stadium includes the structural supports for the Etihad Stadium, a fan zone with canopies and F&B provision, a club shop, hardstanding, and surface car parking to the east, some of which is currently occupied as a site compound for the construction of Co-op Live currently under construction to the north of the Ashton Canal.

4.5. The fan zone with canopies and F&B provision are also to be dismantled and removed from the Site in accordance with the conditions and expiration of the relevant temporary planning consents.

4.6. The Site connects to Alan Turing Way to the east at an existing entry/egress point to the surface car park and site compound.

4.7. The Etihad Campus Tram Stop queue zones form part of the Site to the north, whilst there is a small section of landscaped land immediately adjacent to the National Squash centre, which forms part of the Site to the West.

4.8. A servicing route loops around the Etihad Stadium, crossing the Site east to west. There are 16 sheffield cycle hoops within the Site.

## Site and Surroundings

4.9. The Site is bounded by Joe Mercer Way and the Etihad Campus Metrolink Stop to the north, the National Squash Centre to the west, and the Co-op Live construction site compound as well as Alan Turing Way to the east. The remainder of the existing Etihad Stadium is to the south.

4.10. The Etihad Campus Metrolink Stop and tram lines to the north of the Site are on the Ashton-under-Lyne to Eccles/MediaCityUK Metrolink line, a high frequency service that also connects the site with the city centre and into the Metrolink network as a whole.

4.11. Beyond this and further to the north is the Ashton Canal, which comprises towpath and cycle path routes linking the Site to Manchester City Centre, elsewhere in East Manchester and further afield in the other (eastwards) direction.

4.12. Joe Mercer Way provides a key pedestrian route immediately north of the Site over the Metrolink line and the Ashton Canal from Sportcity Way and from the surface car parks to the north of the Etihad Campus.

4.13. It also links to the Co-op Live Arena to the north-east of the Site, which was granted Planning Permission on 23 Oct 2020 and is currently under construction.

4.14. The Manchester Tennis and Football Centre are located further to the north-west of the Site, also beyond the Ashton Canal.

4.15. A large surface car park for the Etihad Campus occupies the land to the north between the former gasholder and Sportcity Way, which provides access to Alan Turing Way. An additional gasholder is located further west of the Site and the railway line. Beyond the gasholder to the north, the raised railway line acts to separate the residential neighbourhood in Miles Platting from the Etihad Campus and also the industrial uses to the east of Alan Turing Way and north of Philip's Park Cemetery.

4.16. Given the nature of the former use of these gasholders and as they will not be brought back into active use in the future, the two associated Control of Major Accident Hazards Regulations (COMAH) zones, associated with the gasholders have been removed following confirmation from the Secretary of State.

4.17. Alan Turing Way to the east of the Site comprises a four-lane boulevard with segregated cycle lanes. To the east of Alan Turing Way are two nine storey residential apartment buildings, with a number of two-storey residential properties located beyond this in Clayton. The National Cycling Centre is located adjacent to these properties.

4.18. The Eastlands District Centre is located further to the south-east, adding a positive contrast, and supporting the clusters of sports and entertainment facilities in this area. Philips Park, with Philips Park Cemetery located to the north of the Park, are located to the north-east of the Site and Alan Turing Way and are separated by the River Medlock.

4.19. The National Squash centre is located immediately to the west of the Site and is also home to a number of National Governing Bodies (NGB) including England Basketball, England Lacrosse, GB Taekwondo, England Squash, Greater Sport, and Rugby Football League.

4.20. Beyond the National Squash Centre is the Manchester Regional Arena, with the railway line segregating this from the industrial estate further to the west.

4.21. The Site is restricted to the south by the Etihad Stadium, but Ashton New Road bounds the Etihad Campus to the south, with the area beyond this comprising a number of residential properties in Bradford and Beswick.

4.22. The Site is located within Ancoats and Beswick Ward. Clayton and Openshaw Ward is located to the east of the Site along Alan Turing Way, whilst Miles Platting and Newton Heath Ward is located circa 400m to the north of the Site.

## Site Specific Environmental Designations

### Air Quality

4.23. The Site is not located within the Greater Manchester Air Quality Management Area (AQMA), albeit Alan Turing Way, to which the Site connects to, is within the AQMA and is located to the east of the Site.

### Ecology

4.24. A Preliminary Ecological Appraisal is submitted in support of this application. This included an Extended Habitat Survey on the Site. The findings for the Site are summarised below.

4.25. The Site comprises buildings, hardstanding, and some localised scrub and ephemeral short perennial vegetation. There are no protected or priority species identified within or immediately adjacent to the Site, whilst the Site was considered unsuitable for most protected and priority terrestrial species. No invasive species were noted.

4.26. There are also no SSSI within 1 km of the Site, the nearest being the Rochdale Canal SSSI. No National Nature Reserves were located within 1km of the site. Clayton Vale Local Nature Reserve is situated 734 m to the east of the Site.

4.27. Ashton Canal Site of Biological Importance (SBI) is located approximately 50m north of the Site and is a 'Grade B' SBI. The Canal is an important wildlife corridor linking Ashton with Manchester via Openshaw and provides an important accessible natural greenspace in an otherwise urban landscape. The Canal supports a range of aquatic and marginal vegetation, especially the European Protected Species floating water-plantain and the 'endangered' 1 grass-wrack pondweed. Both plants are Priority Species for biodiversity on Section 41 of England's NERC Act 2006.

4.28. There are no existing trees located on the Site.

### Flood Risk

4.29. The Site is located in Flood Zone 1 and therefore has a low probability of flooding. As with the majority of the Regional Centre, the Site is located within the Conurbation Core Critical Drainage Area, as defined in the Manchester, Salford, Trafford Strategic Flood Risk Assessment (SFRA).

4.30. Multiple areas of the Site are at risk from surface water flooding as per EA Flood Risk from Surface Water Mapping. These areas include the radial road and footway around the Etihad Stadium and the proposed access at Gibbon Street/Alan Turing Way junction. However, the vast majority of the flooding extents is considered low risk with an annual chance of occurring between 1 in 100 and 1 in 1000. The surface water flooding shown can be managed by the provision of suitable surface water drainage systems.

4.31. The nearest watercourses to the Site are the Aston Canal, approximately 35m to the north of the Site, and the River Medlock, approximately 170m to the northwest and which is designated as a Main River. The River Medlock is culverted below the car parks on the opposite side of the canal to the north of the Site.

## Coal Mining

4.32. The Site is located within the Central Manchester Coalfield (CMC) and has a long history of coal mining. Early mine workings date as far back as the 1590s, where shallow coal was extracted from thin seams via a method known as 'bell pits'. Eight main coal seams sub-crop across the wider Sportcity area, from the southwest: the Openshaw, Charlotte (Lower Leaf and Upper Leaf), Bradford Three Quarter, Bradford Four Foot, Smut, New Coal, and the Yard.

4.33. The Site has been well characterised by numerous previous investigations and has been subject to remediation (both contamination and geotechnical related) over the past two decades. Further site improvement works are proposed at the Site prior to any construction works associated with this Proposed Development, under Planning Application Ref. 135764/FO/2022 (submitted in December 2022 and currently awaiting determination). .

4.34. A Coal Mining Risk Assessment, Generic Quantitative Risk Assessment, Groundwater Risk Assessment, Ground Engineering Desk Study, and Factual Ground Investigation Report were prepared in support of the site improvement works application and are re-submitted for information in support of this Planning Application (within Volume 2 of this Environmental Statement).

## Heritage

4.35. The Site does not contain any listed buildings and is not located within a Conservation Area. There are a number of listed structures within a 500 metres buffer zone as shown in Figure 4.1 below and listed below:

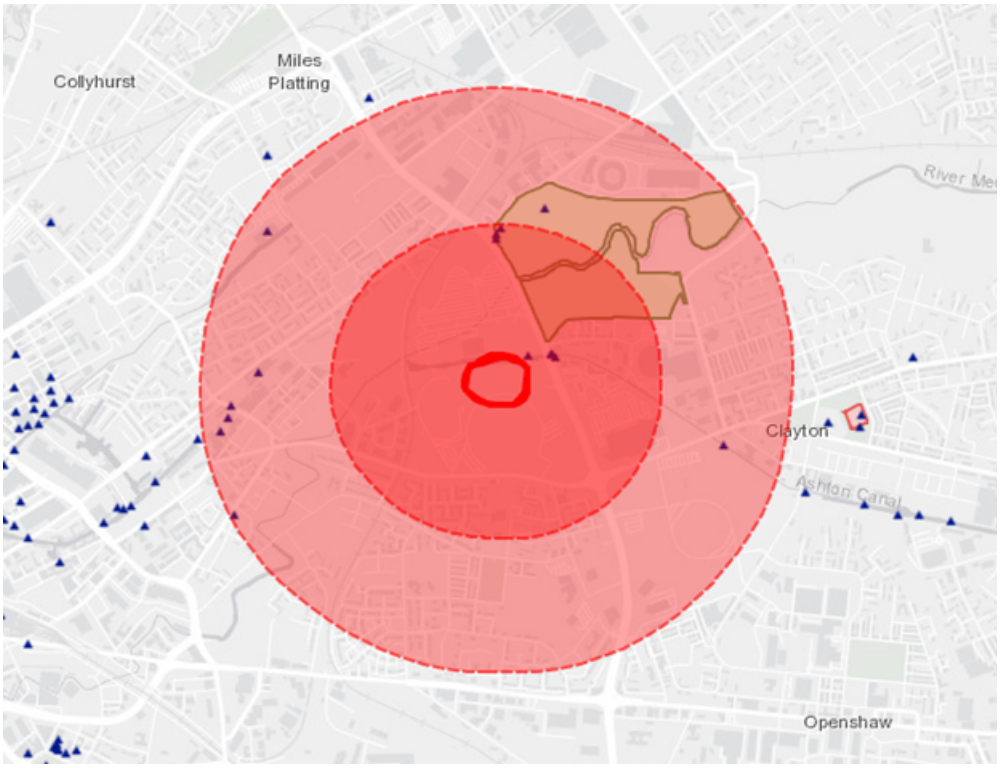
Listed Buildings:

- Ashton Canal Lock Keepers Cottage on Southside of Lock Number 7 of Ashton Canal – Grade II;
- Ashton Canal Lock Number 7 with Roving Bridge Immediately East of Mill Street Bridge – Grade II;
- Ashton Canal Lock Number 6 Immediately East of Forge Lane – Grade II;
- Victoria Mill – Grade II*;
- Entrance Lodge to Main Entrances of Phillips Park Cemetery – Grade II;
- Cemetery Office at Phillips Park Cemetery – Grade II;
- Gates and Railings to the Main Entrance of Philips Park Cemetery – Grade II;
- Cemetery Chapel at Phillips Park Cemetery – Grade II;
- Ashton Canal Bridge Number 9 Over Ashton Canal (Mill Street Bridge) at West End of Lock Number 7 – Grade II;
- Ashton Canal Lock Number 8 – Grade II;

Registered Parks and Gardens:

- Phillips Park – Grade II; and
- Phillips Park Cemetery – Grade II.

Figure 4.1: Search the List - Map Search (Source: Historic England, 2023) of both 1km and 500m radii shown




## Planning History

4.36. The Etihad Stadium, known at the time as The City of Manchester Stadium, was granted Planning Permission (Ref. 056711/VO/NORTH2/99) in October 1999, with construction completed in time to host the Commonwealth Games in 2002.

4.37. Following Manchester City Football Club's occupation of the Etihad Stadium in 2003 and subsequent investment in the Club in 2008 by the Abu Dhabi United Group, Planning Permission (Ref. 105367/JO/2014/N2) was subsequently granted in 2014 for the expansion of the Etihad Stadium.

4.38. The 2014 Planning Permission comprised alterations to the Etihad Stadium, including increasing the overall height of the South and North stands and associated elevational alterations, to allow an increased stand capacity by up to 6,250 seats respectively and up to 2,000 additional pitch side seats creating a total match day capacity of up to 62,170 seats (from 47,670). It also included for the expansion of concourse facilities, alterations to the public realm including changes to car parking layout, landscaping, and boundary treatments as well as associated infrastructure works.

4.39. The Planning Permission included for the potential for both the North Stand and the South Stand to be delivered as one phase of construction, but also the scenario where construction of the South Stand would take place first (Phase 1), with the North Stand expansion (Phase 2) taking place at a later date.

4.40. The Applicant proceeded with the construction of Phase 1 first and the South Stand expansion works were completed in 2015. This included the construction of a third tier and roof to the South Stand, increasing capacity to up to 54,048.

4.41. As it stands, the South Stand expansion works (Phase 1) remains the only phase implemented since the approval of the previous Planning Permission and the North Stand remains unaffected. Nonetheless, Planning Permission Ref. Ref. 105367/JO/2014/N2 remains extant, and it would thus remain possible to implement Phase 2 of this Permission.

4.42. The Proposed Development would result in an expanded Stadium capacity that is within the parameters of the extant planning permission.

4.43. More recently an application was submitted in December 2022 for Site Improvement Works (application ref. 135764/FO/2022) which includes grouting, decommissioning of the existing substation and diversion of existing services and drainage provisions, as well as removal of existing structures including the Club Shop.

## Proposed Development

4.44. The Proposed Development comprises:

- Expansion of the Etihad Stadium North Stand to provide an additional net capacity of 7,910 and an increase in the overall stadium capacity of up to 61,958 and noting that this capacity figure is within the ambit of an extant Planning Permission for expansion of the Stadium, including its north stand, which was granted in 2014.
- Associated hospitality and concourse facilities and an ancillary TV Studio.
- Creation of a roof walk attraction comprising walkways and platforms on the roof of the Etihad Stadium North Stand.
- A nine-storey, 391-bed hotel, with a restaurant at Level 1 and a further 10 suites within the proposed expanded North Stand which are flexible for use as hotel or hospitality space.
    - A further eight storey-building comprising:
    - A new club shop and ticket office at Ground Floor and First Floor;
    - A museum at Level 2 which links directly into the proposed North Stand;
    - An interactive visitor experience venue at Level 3; and,
    - 4,000 sq. m. of workspace at Levels 4, 5, 6 and 7.
- City Square, a significant new covered outdoor fan zone and flexible event space located between the proposed hotel and the further eight-storey building, with year-round food and beverage (F&B) facilities provided at the ground and first floor of the proposed North Stand and interrelated adjoining buildings;
- Creation of new public realm, including the creation of a mix of both hard and soft landscaping, including places to sit and dwell alongside planters and trees; and
- Other associated works, including the creation of a new tree lined access road which will be provided to service the Proposed Development via an existing junction with Alan Turing Way, and a pick-up and drop-off area northeast of the hotel.

4.45. Accompanying the application for Planning Permission is an application for Consent to Display Advertisements. This covers proposals for three large LED screens, one on each of the gable ends of the hotel and commercial buildings, and a further screen proposed on the east elevation of the hotel building.

4.46. For further details of the Proposed Development, please refer to Chapter 3 of the Planning Statement, prepared by Deloitte and the Design and Access Statement prepared by Populous submitted as part of this Application.

# 5. Construction Methodology

## Introduction

5.1. This chapter has been prepared by Laing O'Rourke and Sisk to outline the approach to managing the risk and impact associated with the works to construct the North Stand, Commercial Building, Hotel and Landscaping elements of the Proposed Development. It provides an overview of the anticipated site and construction activities, including:

- Site access and logistics.
- Site establishment.
- Construction operations.
- Control and management of construction activities.
- Waste management.

5.2. It is supported by technical appendices as follows:

- Appendix 5.1 Construction Management Plan (CMP) for the Commercial Building and North Stand prepared by LOR, and;
- Appendix 5.2 CMP for the Hotel and Landscaping prepared by SISK.

5.3. The Contractors for the Development will fulfil the obligations as Principal Designer and Principal Contractor for the works associated with the North Stand, Commercial Building, Hotel and Landscaping.

5.4. Assessments of suitable sub-contractors for the project will be undertaken to establish capability/ suitability, ability to work within confined sites and management procedures to be implemented to ensure successful project delivery. In executing the works, the appointed sub-contractors will implement the appropriate Risk Assessments and Method Statements (RAMS) to ensure the works are executed in a safe and suitable manner and in accordance with the CDM 2015 regulations.

5.5. Whilst defining the obligations and limitations placed on the Contractor when executing the works, this will form the basis for the Construction Phase Health & Safety Plan (CPHSP). The CPHSP will identify key project specific risks associated with the execution of the works and measures implemented place to reduce or mitigate these risks.

5.6. Further detailed CMPs will be prepared by the appointed Contractors in due course and updated as appropriate to reflect comments received. These documents will form a primary mechanism for maintaining the communicative relationship with Manchester City Council and other third parties in understanding the nature of the Proposed Development and the associated construction activities. Where comments or third-party approvals affect the CMPs, the plan will be reviewed and updated as appropriate.

5.7. The CMPs would be periodically updated as required advising of any proposed changes / improvements to the construction methodology.

## Overview of the Works

5.8. The primary construction activities related to the Proposed Development can be summarised as follows: -

- Site clearance, removal and disposal of existing vegetation and scrub.
- Service diversions
- Site levelling and preparation.
- Sub-structure Works (including piled foundations etc.).
- Construction of the Proposed Development.
- Public Realm and associated landscaping works.

### Ground Works

5.9. As set out in the Coal Mining Report (Appendix 7.2) a programme of targeted grouting to stabilise the ground and infill any suspected shafts and/or voids will be completed under a sperate Site Improvement Works Contract.

### Substructure

5.10. The substructure is proposed to be a piled solution. Due to the proximity of adjacent properties, Continuous Flight Auger (CFA) and Rotary piling is proposed to be used for the foundations of the Proposed Development. Pile sizes and depths will be determined by the Contractor. The Contractor's preferred build methodology and design will dictate the quantity of waste from these activities; therefore, this cannot be quantified at this stage. The quantity of material will be calculated by the Contractor and addressed as part of the Contractors' Site Waste Management Plan.

### Superstructure

5.11. The superstructure of the North Stand comprises of a steel frame with associated concrete slabs and concrete terracing units. The superstructure of the Commercial Building comprises of a pre-cast concrete. Vertical restraint to the Proposed Development would be provided through vertical steel cores on the North Stand and Concrete cores on the commercial building. The superstructure of the Hotel comprises an RC frame with supplementary areas of steel frame. The Canopy structure between the Hotel and Commercial buildings comprises steel trusses.

### Building Façade

5.12. Due to the adjacent site topographies, the need to provide a robust construction solution and ensure longevity of the façade. Further development of the design will inform the choices of materials and systems for the façade.

### Health and Safety

5.13. Health and Safety in connection with the Proposed Development is of paramount importance to ensure safe working conditions for site operatives. Activities pertaining to the works will be reviewed and assessed at every stage of the construction process ensuring the appropriate RAMS are in place and always adhered to.

5.14. The Contractors will undertake the Principal Designer and Principal Contactor roles for the duration of the works. A Principal Designer role will be retained by the Employer to assist in compliance with duties under CDM 2015.

5.15. Work will be undertaken in accordance with Health and Safety at Work Act 1974 and other legislative requirements including (but not limited to) the Manual Handling Operations Regulations 1992 and the working at Height Regulations 2005. Designer's risk assessments will be provided to the Contractor to provide a greater understanding of any design considerations or assumptions in the preparation of the RAMS.

5.16. Trained first aid personnel will be available and clearly identifiable on site. The Contractor will develop a site fire plan, identifying evacuation procedures and muster points. Trained fire marshals will be clearly identifiable.

## Construction Activities

### Site Access

5.17. Vehicles accessing the Site from outside the city centre will utilise the motorway network to access the M60 Manchester circular. Appropriate delivery routes will be established to limit the duration of vehicles occupy the network. Diverse routes will be managed by the Contractors to distribute vehicle movements across the network. Where possible, deliveries will be scheduled outside of peak traffic flow times to minimise the impact on the surrounding areas

5.18. Deliveries to Site made from the M60 Manchester circular will utilise the M60 as far as reasonably practical to reduce the impact on traffic within the city centre. Where this is not practical, the use of main A road routes will be prioritised.

### Deliveries and Removals

5.19. All delivery access to the Site will be made via Ashton New Road to the South of the Site. Loading or unloading of plant and materials will not be permitted outside of the Etihad Campus. Delivery access to the Hotel will be via Alan Turing Way.

5.20. Where practical, off-site construction and 'just in time' deliveries will be promoted. Deliveries and waste removal will be managed by the Contractor. No off-site stacking of deliveries will be permitted.

5.21. Materials and components will be locally sourced where practical to minimise transportation distances.

### Contractor Parking

5.22. The Contractors will provide and maintain a Construction Travel Plan for all Contractor and Subcontractor employees for the duration of the works promoting public transport reduce the vehicular movement associated with the works and promote the projects suitability approach to construction.

5.23. Contractor parking will be managed within allocated car parks (Grey Car Park and Car Park 'K'). Contractor parking will not be available during match / Campus event periods.

### Plant and Equipment

5.24. Tower cranes, MEWP's, Mast climbers and mobile cranes will be utilised for the construction of the Proposed Development with crawler cranes for the movement and positioning of the primary structure. Where practical, construction techniques and the associated plant and equipment will be selected to minimise acoustic intrusions on surrounding areas.

5.25. The Contractors will develop a detailed schedule of plant and equipment to confirm these assumptions in due course.

### Operating Hours

5.26. Site operating hours will adhere with Manchester City Council's (MCC) 'Environmental Protection Information for Developers': -

- Monday – Friday 07:00 – 18:00hrs
- Saturday 08:00 – 16:30hrs
- Sunday/ Bank Holidays No works permitted
- Closed football season – 24/7 working required (internal works only with no deliveries through the night)

5.27. To reduce the impact on the existing transport and public transport infrastructure of operatives attending site, arrival of the workforce on site 30 minutes prior to the permitted operating hours for setting up will be encouraged.

5.28. No works will commence outside of the above permitted times without prior agreement by Manchester City Council.

## Programme

### Key Dates

5.29. The current master programme is a development-based programme with the following key dates:

- Planning Submission Q2 2023.
- RIBA Workstage 4 Q2 2023
- Contract Award Q3 2023.
- Site Mobilisation Q3 2023.
- Completion Q3 2026.

5.30. The works will be undertaken in a single phase, with a Site Improvement Works contract to prepare the Site to include:

- Site clearance.
- Service diversions.
- Mine Grouting Works.
- Temporary Concourse Alterations.
- Fan route establishment.
- Site establishment.

5.31. A detailed programme of construction activities and sequencing will be provided by the Contractors as part of the detailed CMP.

## Site Setup and Operations

5.32. The following site setup and operational requirements apply to the Proposed Development and will be developed in further detail by the Contractors.

## Site Establishment

5.33. The Site compound will be located on the Etihad Campus to the South East side of the Proposed Development site for North Stand and Commercial Building; and to the North East of the site for the Hotel. . Construction activities will always be contained within the Site where possible.

5.34. The following will be provided for the works as temporary facilities:

- Project offices.
- Meeting and conference facilities.
- Induction and training centre.
- Canteen and rest area.
- Toilets and washroom facilities.

5.35. Material storage and waste segregation will be managed by the Contractors to prevent cross contamination of materials whilst promoting recycling and reducing waste to landfill. All flammables waste streams and those with potential environmentally adverse impacts will be appropriately contained and managed by the Contractors.

5.36. Fuel and oil will be stored in accordance with the Control of Substances Hazardous to Health (England) Regulations with refuelling and transfer of fuel oils undertaken in designated areas of hardstanding by trained personnel, equipped with the appropriate spill kits and emergency action plans.

5.37. Lighting associated with the Site and site establishment will be designed to minimise light spillage to limit the impact on adjacent properties, highways and canals.

## Site and Boundary Fencing

5.38. The Site is secured to the north, east, south and west by c. 2.4m high Vehicular Control Barrier (VCB) Hoarding (height to be confirmed as part of the security package). This will be retained throughout the development to maintain crowd flow areas, segregation of the works and the protection of the public

5.39. This hoarding will be used to the perimeter of the Site and sealed to the ground to further reduce dust arising and further prevent materials and debris leaving the Site and potentially entering water bodies.

5.40. Site hoardings will be utilised to inform others of the Proposed Development and coloured as appropriate

## Access Routes and Points

5.41. The method of delivery for plant and materials, and removal of waste from the Site will be defined by the Contractors using key access roads into the Site and surrounding areas.

5.42. Turnstiles to secure the Site from unauthorised access will be in place at all pedestrian access points. Banksman will be present at all vehicular access points.

5.43. Details of the proposed site access arrangements are identified on the Site Logistics Plan within Appendix A of the Outline CMPs at Appendix 5.1 and 5.2

## Housekeeping

5.44. The Contractors will maintain a high level of site cleanliness to:

- Reduce potential Health and Safety issues arising from poor working conditions.

- Improve working conditions and operational productivity.
- Reduce waste material on site.
- Remove the potential for waste material inadvertently leaving site (wind conditions etc.).

5.45. In maintaining the cleanliness of the Site, the Contractor will also ensure:

- The appropriate behaviour of the works force (including subcontractors) is appropriate both on- and off-site.
- Waste is removed from the Site at regular intervals to prevent local wildlife being attracted onto site and the potential for fire hazards on site.
- Cleanliness of adjacent roads affected by the works are maintained (wheel washing, road sweepers etc.).
- No fires are permitted on site.

## Wheel Wash Facilities and Road Sweeping

5.46. A road sweeping regime will be implemented and tailored to suit on site activities on an appropriate basis where required.

## Lighting of the Site

5.47. To minimise light spill from the Site and reduce the impact of the localised townscape and ecology, directional lighting will be used to illuminate the Site. Localised task lighting will be provided as required by the Contractor to execute the Proposed Development.

5.48. In line with the UK National Energy Efficiency Action Plan, the Contractor will implement, where possible, greener sources and more energy efficient plant to assist in cutting carbon dioxide emissions by:

- Monitoring and reducing energy consumption during construction.
- Maximising plant and equipment fuel / energy usage efficiency.
- Maximising renewable energy sources.
- Reducing workforce travel and promoting sustainable modes of transport.
- Utilising localised supply chains to reduce transportation.

## Materials

5.49. In the selection of material, consideration will be given to the embodied carbon footprint, its recyclability and recycled values / content. The Contractor will employ procurement procedures, ensuring the environmental impact of materials are considered in their selection.

5.50. The use of local supply chains will be promoted to reduce the transportation impact of materials to and from site, whilst investing capital into the local economy and supply chains.

5.51. All timber used on site will be FSC or PEFC compliant and obtained from sustainable sources.

### Waste

5.52. Prior to commencing the works, the Contractors will establish a Construction Waste Management Plan (CWMP). The CWMP will identify:

- The various waste streams generated by the construction of the Proposed Development.
- Methods of waste segregation.
- Estimated quantity of each waste type.
- The waste management action for eradicating waste in the first case and, where not possible, implementing the re-use, reduce, recycle, and disposal for each waste type.

5.53. The Contractor will:

- Review the CWMP.
- Record quantities and types of waste produced.
- Record the types and quantities of waste that have been:
    - Reused (on or off site).
    - Recycled (on or off site).
    - Sent of other forms of recovery (on or off site).
    - Sent to landfill.
    - Otherwise disposed of.
- Update the plan to reflect the progress of the project

5.54. Where practical, off-site modular construction will be promoted to reduce waste material going off site.

## Construction Methodology

5.55. At this stage of design development, the structure of the Proposed Development can be summarised as follows:

### North Stand

- Pile substructure with pile caps.
- Steel structural support cores to the NS
- Pre-cast terracing units
- Steel structural roof truss supports

### Commercial Building

- Pile substructure with pile caps
- Pre-cast concrete columns and beams to ground floor areas.

- Concrete cores to provide vertical stability.

## Hotel Building

- Pile substructure with pile caps
- In situ concrete frame, including concrete cores.
- Steel frame to the link with the North Stand and the cantilever to the North end of the hotel.

5.56. Following site preparation completed as part of the enabling works, the outline construction programme and methodology can be summarised as follows:

Table 5.1 Indicative Construction Programme

| North Stand Construction | | Date | Commercial / Offices Construction | Date | Hotel / Landscaping | Date | |
|---|---|---|---|---|---|---|---|
| Substructure | | Wk 0-55 | Substructure | Wk 14-30 | Substructure | Wk 39-56 | Installation of CFA piles, pile caps and ground beams to support the primary structural frame. Installation of retaining walls, below ground structures and structural waterproofing. Temporary ground profiling to facilitate the works. Installation and connection of foul and surface water drainage systems. |
| Superstructure | | Wk 13-67 | Superstructure | Wk 29-69 | superstructure | Wk 48-126 | Installation of structural steel / pc concrete frame, complete with Insitu composite floors and vertical cores. Installation predominantly by Tower cranes. |
| Bowl Arena (above Level 02) | | Wk 33-68 | n/a | | | | Floor by floor sequential installation of the superstructure and raking tiers forming the bowl, complete with Insitu composite floors and vertical cores. |
| Roofs | | Wk 50-64 | Roof | Wk 61-82 | Roof | WK 61-100 | Single ply or Hotmelt type application |
| Bowl Roof | | Wk 59-86 | n/a | | | | Installation of roof trusses using Tower, Crawler or Mobile cranes, and installtion of roofing sheets |
| Building Facade | | Wk 49-80 | Building Facade | Wk 48-81 | Building Facade | Wk 63-132 | Installation of building façades via MEWP access. Hotel via mast climbers |
| Fit out | | Wk 45-95 | Fit out | Wk 45-108 | Fit Out | Wk 84-148 | Installation of partitions, ceilings and finishes etc. |
| M&E Installations | | Wk 45-95 | M&E Installation | Wk 45-108 | M&E Instillation | | Installation of Plant and specialist M&E equipment |

| North Stand Construction | | Date | Commercial / Offices Construction | Date | Hotel / Landscaping | Date | |
|---|---|---|---|---|---|---|---|
| Testing & Commissioning | | Wk 70-95 | Testing & Commissioning | Wk 84-108 | | | Testing and commissioning of the M&E installations, including witnessing by the Local Authority. |
| External Works | | Wk 66-95 | External Works | Wk 135-170 | External Works | Wk 96-128 | Installation of hard/ soft landscaping and planting |

5.57. The above is an indicative construction timeline and construction methodology. A detailed programme of construction activities and sequencing will be provided by the Contractor.

## Control Measures

### Personnel Protection

5.58. In maintaining a safe site, the Contractor will implement a Health & Safety regime for all site operatives and site visitors to ensure a standardised ethos to safety through the implementation of appropriate PPE. The Principal Contractors will review operation specific Risk Assessments and Method Statements (RAMS), ensuring process specific measures are implemented as appropriate.

### Protection of Environmental Features

5.59 Measures for protection will be identified during completion of our Environmental Risk Assessment.

### Noise and Vibration

5.59. Noise and vibration of site activities will be kept to a minimum as far as reasonably practical for the duration of the works and particularly during the first operating hour of the Site. Where the Contractor is required to operate the Site outside of these times, this will only be permitted following consultation and agreement with Manchester City Council's Environmental Health Officer. The Contractors will prepare a specific Management Plans for the control and monitoring of noise and vibration relating to the works, identify noise generating plant and equipment used on site (including type, size and quantity).

5.60. The Contractor makes the necessary Section 61 Control of Pollution Act 1974 applications to the local authority at least 28 days prior to the works, obtaining the relevant consents prior to undertaking the works. Works will be executed in accordance said consents.

5.61. In addition to any restrictions, limitation and or obligations imposed by the Section 61 consent, the Contractor complies with the requirements of the statutory code of practise BS: 5228.

### Air Quality

5.62. Prior to the commencement of the works, the Contractor undertakes an air quality assessment and management plan identifying the management and monitoring of dust, smoke and other airborne pollutants.

5.63. Following completion of the air quality assessment, the Contractor makes all necessary applications pertaining to the works, seeking consent from the relevant Pollution Control Authority (Local Authority and/or Environment Agency) in accordance with the Environmental Protection Act 1990 and Pollution Prevention Control Act 1999.

## Site Deliveries

5.64. Selection of appropriate vehicles sizes relative to the delivery load will be managed by the Contractor to minimise vehicle pollutants. Where possible these will be co-ordinated with deliveries to nearby sites to minimise vehicles mileage to and from distribution centres.

5.65. Vehicles carrying loose material to and from site will be sheeted to prevent spillage and reduce dusty emissions during transit.

5.66. Implementation of these measures is the responsibility of the Contractor. The Contractor records and reports activities in relation to these measures and any subsequent corrective measures employed, ensuring records are available at all times.

## Construction Vehicles

5.67. All vehicles regularly used on Site will comply with the relevant emissions standards/ legislation and will be serviced in accordance with the manufacturer's recommendations. Vehicles also using public highways will comply with all MOT requirements. The Contractor shall provide all MOT and service documentation for Local Authority inspection upon request and a running log of: -

- Any complaints relating to emissions alleged because of construction activities, received from either a resident or local business
- The date and vehicle identification number of any construction vehicle observed to be carrying material that has the potential to release dust and does not have the appropriate sheeting measures in place; and
- The date and location of any cleaning of paved areas and roads

5.68. The Contractor ensures no construction plant or vehicle engines are left running when not in use except when the Employer's Project Manager considers there is a valid operational reasoning or justification. The Contractor is encouraged to use low pollutant vehicles or 'green' vehicles in the execution of the works.

5.69. All construction vehicles tracking the site will adhere to the site speed limit and route controls.

## Dust Suppression

5.70. The Contractor employs dust suppression systems as appropriate during the works to reduce the quantity of airborne pollutants, providing suitable water bowsers and/or sprays for the task. To limit the generation of dust on and off site, the Contractor will employ appropriate dampening and wheel wash measures for all vehicles trafficking site. Unloading of loose material (spoil) will adhere to the control drop height to control dust release. Smaller hand held tools will be fitted with localised dust collectors or dust suppression systems.

5.71. To reduce any windblown dust arising from stacked materials, the Contractor ensures stacked materials are profiled to minimise wind and rain impact and subsequent erosion. Earth mounds will be kept sufficiently damp to further limit wind impact. Where appropriate, seeding of earth mounds will be encouraged. Where possible, stacked materials with the potential to create dust emissions will be located away from site boundaries.

## Hard Standings

5.72. The use of existing hard standings will be promoted to reduce site churn and airborne dust during site operations. Extensions of existing hardstanding will promoted in favour of new hardstanding. Hardstanding will be incorporated within the permanent works where practical.

## Water Quality and Drainage

5.73. In executing the works, the Contractor will adopt good construction management practices to reduce the risk of accidental discharge and contamination of rivers, streams, ponds and ground water. These practises will be incorporated into the CMP and include:

- The extent and status of all ground water to the land below the works and any temporary works and land use for the removal of material from site and;
- Comply with the 'Policy and Practice for the Protection of Groundwater Environment Agency TSO 1998'.
- Control of sediment and loads to surface water systems.
- The Pollution Control and contingency plan to identify the requirements for pollution control and emergency procedures for the works.
- Measures for minimising water consumption during the construction process.
- Details of the construction phase drainage strategy during the works (using permanent drainage systems where possible).

## Aquifer – River Medlock

5.74. The River Medlock is the nearest water course to the Proposed Development, with a culverted section passing roughly 200m north of the site boundary.

5.75. It is not anticipated that the site will have any bearing on the River Medlock or the culverted section, nor are they expected to impact on site (through tidal or fluvial flooding). This is also borne out in the approach to the mine grouting required and that it has been accepted by the EA as a low-risk operation.

## Ashton Canal

5.76. There is some residual risk associated with low-risk probability events (eg. breaching). However, given that the Proposed Development is significantly elevated in comparison this is still considered low risk.

## Flood Risk

5.77. The 'Project North Stand Manchester: Flood Risk Assessment' (FRA) indicates that the entirety of the site sits within Flood Zone 1. This means that the site is at low risk of flooding from rivers and seas. The surface water flood map also indicates that the site is at low probability of flooding.

5.78. Furthermore, there are a range of attenuation features designed in, though the reduced rate of run-off is yet to be confirmed but is anticipated to be a 50% reduction compared to the existing run-off rate.

5.79. The conclusion of the FRA states that 'It is concluded that the Proposed Development has a low risk of flooding and no significant adverse impact to sites elsewhere'.

## Unexploded Ordinance

5.80. The 'Detailed Unexploded Ordnance (UXO) Threat and Risk assessment study for the site has been deemed as low risk for the presence of UxO. There have been no risk mitigation measures recommended on the development site.

## Vapour/ Ground Gases

5.81. Prior to execution of the Works, an assessment of the potential and extent of any ground gasses associated with the Works will be undertaken. The design will ensure appropriate gas protection measures are

implemented to protect the building and its occupants and are addressed in connection with undertaking the Works to ensure safety of all site operatives. The control measures implemented for entering and working within confined spaces will be clearly identified within all RAMS.

### Archaeology and Cultural Heritage

5.82. Due to the previous industrial usage of the Site and the Site remediation works, no designated sites of archaeological sensitivity have been identified in connection with the Site. It has been established that a watching brief will be in place during a section of the sub-structure works.

## Pollution Control and Contingency Plan

5.83. An environmental emergency plan will be developed by the Contractor to reflect construction activities and will form part of the Environmental Management Plan.

5.84. Measures will be developed by the Contractor to minimise and control site runoff to prevent contamination. These measures will take account of the Environment Pollution Prevention Guidelines:

- PPG1 General guide to the prevention of pollution
- PPG5 Works and maintenance in or near water
- PPG6 Working at construction and demolition site
- PPG18 Managing fire-water and major spillages
- PPG21 Pollution incident response planning
- PPG22 Dealing with spillages on highways

### Definition of a Pollutant

5.85. Pollutants are substances that pollute the environment which renders the air, soil, water, or other natural resource harmful or unsuitable for a specific purpose. Environmental incidents occur when an activity or event causes or has the potential to cause harm to people or damage to property and or the environment.

### Pollution Prevention

5.86. Works will be undertaken in close proximity to the Ashton Canal and existing drainage networks. Works may also affect the existing ground water table. Appropriate prevention methods will be implemented throughout the duration of these works.

### Concrete and Cementitious Materials

5.87. Concrete and cementitious based materials are alkaline and are potential pollutants. To reduce the risk of any runoff entering watercourse, mixing will be undertaken a minimum of 10 meters away from watercourses. Wash from concrete and cement works is not discharged into a watercourse.

### Oils and fuels

5.88. All oil and fuel will be stored in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001, ensuring safe storage of material and controlled access at all times and:

- Storage areas are not located within 10 meters of a watercourse or highway gully
- Mobile bowsers are bunded and comply with the requirements of Control of Pollution (Oil Storage) (England) Regulations 2001

- Storage drums are contained within bunded areas with a minimum of 25% of the total volume of the volume contained within the bund or, 110% of the largest container, whichever is the greater.
- Refuelling of plant and equipment is undertaken by trained operatives
- Plant is regularly checked for leaks and is regularly maintained.
- Drip trays are placed below any standing plant and equipment.
- Static combustion engine plant (e.g. compressors etc.) are fully integrally bunded or placed on drip trays.
- Spill kits are provided within close proximity to oil and fuel storage areas, ensuring operatives are trained in their use.

5.89. The use of non-toxic biodegradable fluids and oils is encouraged and must be used in all sensitive locations or areas of increased pollution risk.

## Plant Maintenance

5.90. Maintenance of any plant will be undertaken at least 10 meters from any watercourse or drain. Spill kits must be available and on hand during all maintenance operations with drip trays to contain any leakage of oil or fuels.

5.91. Any plant or equipment considered a pollutant risk will be repaired or removed from site.

## Ground Material and Control of Sedimentation

5.92. Disturbance and handling of soils (particularly in wet weather) can lead to the transfer of particles by running water into watercourses. Potential sedimentation of watercourse as a result of these works include Ashton Canal and highway gullies. The Contractor will employer soils management ensuring:

- Activities likely to give rise to sedimentation of watercourses are located away from water courses.
- Silt fencing is in place to suspend particles from running water
- Settlement tanks or silt tanks are utilised to suspend particles prior to its release into any watercourse

## Excavated Spoil

5.93. Excavated spoil will be removed from site as works progress. Where practical materials will be reused on site. Removed materials will treated off site or disposed of as appropriate.

## Construction Waste Materials

5.94. Waste materials will controlled in line CWMP and secured to prevent cross contamination of waste streams or pollution of any water courses. Any liquid waste will be secured in a suitably lined container within a bunded area.

## Trade Effluent

5.95. Trade effluent (toilets etc.) will be connected to a foul water drainage system for the duration of the works. Where temporary chemical recirculating toilets are used, their use will be limited as far as reasonably practical and appropriately secured/ weighted to prevent spills. Emptying and refilling will be undertaken by a licensed contractor.

### Notification Procedures

5.96. Procedures for the notification and reporting of spillages, pollutants or environmental incidents will be clearly set out within the Contractor's CMP and reinforced through site inductions and toolbox talks.

5.97. The procedure will include details of the recording and reporting process of incidents and details of those notified.

5.98. Contact details for key on site personnel and emergency response persons responsible for environmental protection will be displayed in key locations around the Site and include details of:

- Contractor's Project Manger
- Construction Site Manger
- Contractor's Environmental Manager
- Employer's Project Manager
- Community Liaison Officer
- Emergency Services
- Environment Agency

5.99. The Contractor will promote a system of good working practices, actively encouraging suggestions from operatives to improve operational procedures to reduce the risk of environmental incidents, and anonymous reporting of works not being undertaken in accordance with the CMP.

## Communications

### Project Communications

5.100. To ensure the Health and Safety, Operational and Environmental requirements of the project are communicated effectively and efficiently, this CMP will be distributed to all members of the project team (incl. sub-contractors). Control and mitigation measures associated with key activities or potentially environmentally sensitive operations will be agreed and regularly reviewed between the Contractor and Employer. The Contractor will ensure copies of the following are available on site for review at all times:

- this CMP and/or Contractor's CMP
- the project, Employer and any company environmental policies
- the list of key contacts associated with the works

5.97 During the construction phase of the works, regular internal meetings will occur to identify:

- Progress over the period.
- Works planned over the next period.
- Inductions and training undertaken over the period.
- Health and safety issues incurred (incl. near misses etc.)
- Records on inspections and audits, with a schedule of non-conformances issued.

- Feedback from Community liaisons, copes of any complaints received and mitigation measures implemented.
- Visits and inspections by third parties, including statutory bodies and H&S monitoring officers.
- Records and compliance with the environmental performance and objectives.

5.101. Internal and external communication methods will be defined by the Contractor, maintaining dialogue through the Community Liaison Officer as appropriate. External communications will be coordinated with the Employer's Project Manager to ensure effective and appropriate communications.

### Community Liaisons

5.102. Community liaisons will be coordinated with the Employer's CLO during the construction process, providing the community with regular updates on the works.

## Compliance

5.103. Successful implementation of this CMP relies on regular review and updates in response to evolving site conditions. The Contractor will define appropriate measures and procedures to review activities against the CMP and legal/ statutory requirements and any measures implemented in response to CCIs.

### Recording

5.104. The Contractor maintains a register of compliance issuing Non-Conformance Reports (NCR's) identifying actions or works not undertaken in accordance with the CMP, method statements or legislative requirements and obligations. The NCR will be accompanied with the appropriate Corrective Action Report (CAR) detailing:

- Action owner(s).
- Corrective measures required.
- Monitoring/ inspection and signoff procedures to be implemented.
- Timescales for close out.
- 3rd party approvals upon completion of the corrective measures.

5.105. As part of the CAR process, a lessons learnt workshop will be conducted to prevent reoccurrence of the event.

### Monitoring

5.106. Environmental monitoring of the works will be undertaken during the construction phase to evaluate the environmental impact of the works. This information will be assessed in conjunction with the CMP and improvements/ revisions to the CMP made where appropriate.

5.107. A programme of environmental monitoring will be established by the Construction Environmental Manager to suit the construction programme and works on site. Monitoring will be undertaken and assessed against the legal/ legislative requirements, consents and project targets/ requirements.

### Review Process

5.108. Records of waste management and environmental aspects pertaining to the works will be mainlined in accordance with the CMP or respective organisational requirements (which ever is the greater). Records are to be maintained in both digital and hard copies to protect against damage, deterioration or loss and made

available to the Employer's Project Manager upon request. Disposal will be upon express consent of the Employer's Project Manager.

## Complaints, Compliments and Inquires

### Procedures

5.109. A complaints, compliments and inquires procedure (CCI) will be implemented to ensure members of the public wishing to complain, provide feedback or make inquiries can do so. Contact details will be published for use by members of the public with the public actively encouraged to engage as part of the Community Liaison. Liaisons with local councillors, Town/ Parish Councils and the local authority (incl. environmental health) will be undertaken to address any concerns or issues raised directly to councillors by the general public.

5.110. Any CCI's received will be recorded and reported to the Employer's Project Manager and include:

- Parties affected/ reporting
- Timing
- Location
- On site activities being undertaken

5.108 All complete with details of any reactive measures implemented where appropriate.

### Reporting

5.111. Any CCIs raised will be reported at internal progress meetings to ensure appropriate measures are being implemented, improving the impact on the community during the construction phase.

5.112. The Environmental Health Team at MCC may be the first contact for residents affected by the works. Ongoing dialogue will be undertaken with the Environmental Health Team to ensure responses to any complaints can be provided swiftly.

5.113. Due to the nature of the proposals and proximity of adjacent residents, the works may be subject to a Section 61 application under the Control of Pollution Act 1974 prior to commencing the works. The Contractor will agree any mitigation measures in connection with this application with the Local Authority, obtaining the required permits/ licenses prior to commencing the works.

### Feedback

5.114. To validate the CCI process, feedback on any CCIs raised will be provided as part of the community liaison process. Feedback sessions will identify:

- Details of the CCI.
- Assessment undertaken.
- Mitigation measures implemented.

5.115. Any additional beneficiary measures and options will be discussed with the community to further improve the impact of the community during the construction phase.

# 6. Air Quality

## Introduction

6.1 This Chapter of the ES has been prepared by Buro Happold and assesses the likely Air Quality impacts of the Proposed Development upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts, and the likely residual impacts after these methods have been adopted.

6.2 This Chapter is accompanied by 8 technical appendices:

- Appendix 6.1 - Construction Assessment Methodology;
- Appendix 6.2 - IAQM Assessment Criteria for Operational Impacts;
- Appendix 6.3 - Traffic Data;
- Appendix 6.4 - Model Verification;
- Appendix 6.5 - Human Receptor Locations and Addresses;
- Appendix 6.6 - Modelling Results - Construction;
- Appendix 6.7 - Modelling Results - Operation; and
- Appendix 6.8 - Construction Mitigation.

| Technical Competence in Air Quality and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Yi Zhang | Peter Henshaw |
| Company | Buro Happold | Buro Happold |
| Qualifications/Accreditations relevant to technical area | Associate Member of Institute of Air Quality Management (AIAQM) | Member of Institute of Air Quality Management (AIAQM) (MIAQM), Charted Scientist (CSci) |
| Does the practitioner hold any IEMA qualification? | No | No |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 2 | 10 |
| Number of EIA's delivered to date | <10 | 30+ |

## Limitations and Assumptions

6.3 There are a number of components that contribute to the uncertainty of the assessment, most notably with regard to modelling predictions. The road traffic emissions dispersion model used in this

assessment is dependent upon the traffic data that have been inputted, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

6.4 To reduce this uncertainty, model verification has been carried out to assess traffic emissions by comparing modelled and monitored concentrations, which will ensure a good degree of confidence in modelled results for the existing baseline year. 2019 has been selected as the baseline year, due to reasons detailed in the Baseline Study Methodology section. For future years there will inevitably be a greater level of uncertainty owing to future trends in air quality conditions, as well as the uptake and performance of more stringent vehicle emission standards within the vehicle fleet. Regarding future vehicle emissions, studies indicate that Defra's emission factor toolkit v.11 (Defra, 2021) provides an accurate prediction of the most likely future vehicle emissions reductions and may even under-predict the rate of vehicle emissions reduction.

## Legislative and Policy Context

6.5 This section identifies the legislation, policy and guidance that has informed the assessment of effects for air quality. Legislation relevant to the assessment is detailed along with the national, regional and local policy.

### Legislation and National Planning Policy

#### The Ambient Air Quality Directive (EU, 2022)

6.6 The European Union (EU) directive on ambient air quality and cleaner air for Europe (2008/50/EC) sets legally binding limit values, target values, and critical levels for a number of air pollutants established by the European Council for the Protection of Human Health, Vegetation, and Ecosystems.

#### Air Quality Standards Regulations (HM Government, 2010)

6.7 This UK legislation implemented the requirements of the ambient air quality directive and set legally binding limit values for air quality with respect to human health and vegetation. The regulation transposes Directive 2008/50/EC, which entered into force in Europe in June 2008; it consolidates and replaces previous ambient air quality legislation. The Regulations were subsequently updated in 2016 (The Air Quality Standards (Amendment) Regulations 2016).

#### Part IV of the Environment Act (HM Government, 1995)

6.8 Part IV of the Environment Act 1995 places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy (AQS) with the aim of reducing atmospheric emissions and improving air quality. The latest AQS for England, Scotland, Wales, and Northern Ireland was published in 2007, and provides air quality standards and objectives for key pollutants, which are designed to protect human health and the environment. It also sets out how different sectors (industry, transport and local government) can contribute to achieving the air quality objectives. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a Local Air Quality Management (LAQM) process. This requires local authorities to regularly and systematically review and assess air quality within their boundaries against these objectives and appraise development and transport plans against these assessments.

6.9 In areas where air quality objectives are not likely to be met by the relevant target date, local authorities are required to declare an Air Quality Management Area (AQMA) and develop an air quality action plan in pursuit of the air quality objectives.

6.10 The Environment Act was amended in 2021, requiring the government to set a short-term target and revise the long-term target for $PM_{2.5}$, as detailed in the Air quality objectives section.

#### Air quality objectives

6.11 This air quality assessment is conducted to assess compliance with UK air quality objectives (AQO). The air quality objectives relevant to this assessment are presented in Table 6.1. It should be noted that air quality objectives are numerically the same as the EU limit values detailed within the Air Quality Standards Regulations; however, differ in terms of compliance dates, locations where the limit values apply, and the legal responsibility for ensuring compliance.

6.12 Air quality objectives are applicable at all locations where members of the public might be regularly exposed. This includes building facades of residential properties, schools, hospitals and care homes.

Table 6.1 National Air Quality Objectives relevant to the assessment.

| Pollutant | Concentration ($\mu g/m^3$) | Averaging Period | Number of allowable exceedances per calendar year |
|---|---|---|---|
| Nitrogen dioxide ($NO_2$) | 40 | Annual mean | N/A |
| | 200 | Hourly mean | 18 |
| Particulates <10µm in diameter ($PM_{10}$) | 40 | Annual mean | N/A |
| | 50 | Daily mean | 35 |
| Particulates <2.5µm in diameter ($PM_{2.5}$) | 20 | Annual mean | N/A |

6.13 The Environmental Targets Regulations 2023 sets out a new $PM_{2.5}$ concentration target, fulfilling the legally binding duty outlined in the Environment Act (Part 1). The new target aims to achieve a maximum annual average $PM_{2.5}$ concentration of $10\mu g/m^3$ across England by 2040.

### National Planning Policy Framework

6.14 The National Planning Policy Framework (NPPF) underlines the importance of local authorities contributing towards improving and protecting the environment. The legislation points toward the need to focus on enhancing biodiversity, minimising waste and pollution, and mitigation/adaptation to climate change.

6.15 With particular regard to air quality management, Section 9 of the NPPF notes that the environmental impact of transport and traffic should be identified and assessed, while mitigating adverse effects to bring about net environmental gains. The guidance states that the planning system should actively manage patterns of growth, offering a choice of transport modes to reduce air pollution:

*"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."*

6.16 Further to this, Section 15 of the NPPF notes that planning policies should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ), 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. Additionally, the NPPF states that planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

### Planning Practice Guidance

6.17 Planning Practice Guidance (PPG) provides guiding principles on how the planning process can consider the impact of new development on air quality. The guidance outlines when air quality considerations could be relevant to the development management process. The PPG states:

*"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.*

*Where air quality is a relevant consideration the local planning authority may need to establish:*

*The 'baseline' local air quality, including what would happen to air quality in the absence of the development;*

*Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*

*Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

6.18 The guidance also outlines specific issues that may need to be considered when assessing air quality impacts. Relevant considerations include when a development would:

- *"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

6.19 The guidance also details how air quality impacts can be mitigated, stating that mitigation should be spatially specific, dependent on the proposals, and proportionate to the likely impact. The following examples of mitigation are given:

- Maintaining adequate separation distances between sources of air pollution and receptors;
- Using green infrastructure, in particular trees, where this can create a barrier or maintain separation between sources of pollution and receptors;

- Appropriate means of filtration and ventilation;
- Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);
- Controlling dust and emissions from construction, operation and demolition; and
- Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development.

## Local Planning Policy

### Manchester Core Strategy Development Plan (2012-2027) (Manchester City Council, 2012)

6.20 The Manchester Core Strategy Development Plan is the primary strategic planning document in the City's Local Development Framework. It outlines the council's vision for Manchester from 2012 to 2027 and sets out planning policies that aim to help the city achieve the Local Development Framework's vision.

6.21 The Manchester Core Strategy Development Plan has adopted a number of policies relevant to air quality, including the following:

Policy EN 16 (Air Quality)

*6.22* "*The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact 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 plants."*

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

Policy EN 7 (Energy Infrastructure opportunities)

6.24 Policy EN 7 sets out a general presumption in favour of low and zero carbon decentralised energy schemes, subject to a number of considerations. Those that relate to air quality, in particular, are as follows:

- *"Any new generating plant capable of producing heat and cooling as well as electricity should be located in a way that facilitates future connection to a local distributed energy system.*
- *Any energy centre, including generating plant, standby/boiler plant and substations, shall be located and designed to a high quality so as to integrate with and contribute to the townscape.*
- *Biofuels should be obtained from sustainable sources and processes and in a way that minimise transport impacts, following a sequential approach in order to minimise CO2 emissions – firstly prioritising local and regional sources, followed by national, European and international.*
- *Consideration should be given to biofuel delivery by rail and waterways where possible. Where large-scale fuel or feedstock delivery is required by road the energy centre must be located in or adjacent to light industrial, industrial or leisure uses with any impact on local residential amenity minimised.*
- *The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN 16 (Air Quality)."*

Policy DM 1 (Development Management)

6.25 Policy DM 1 outlines the key parameters that should be addressed as part of a planning proposal, those relevant to Air Quality include:

*6.26 "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."*

### The Greater Manchester Strategy (GMCA, 2017)

6.27 The Greater Manchester Combined Authority (GMCA) published the Greater Manchester Strategy, which sets out the city's ambition to become one of the top places in the world to live and work. The strategy addresses key priorities to improve education and skills, health, wellbeing, the environment, work opportunities, and economic growth across the towns, cities, communities, and neighbourhoods in Greater Manchester. The strategy has been prepared by all ten Greater Manchester councils, the Mayor, the NHS, transport/police/and fire services and has had input from a number of key stakeholders (the public, businesses and voluntary/community/social enterprise organisations).

6.28 With regards to improving the environmental conditions of Greater Manchester, particularly air quality, the following statement is made in the strategy:

Priority 7 – A green city region and a high quality culture and leisure offer for all

*6.29 "Air pollution and greenhouse gas emissions cause significant harm to the environment, to the health of communities, and damage Greater Manchester's economy. Road transport contributes 32% of carbon dioxide emissions with emissions from commercial and domestic buildings accounting for 32% and 37% respectively."*

### Manchester Climate Change Strategy 2017-50 (MCCA, 2016a) and Implementation Plan 2017-22 (MCCA, 2016b)

6.30 Manchester's Climate Change Strategy 2017-50 outlines the city's commitment to play its full part in limiting the impacts of global climate change, locally and globally and to become zero carbon, zero waste, and climate resilient by 2050. The strategy has five headline objectives:

- Sustainable economy and jobs;
- Healthy communities;
- Resilience to climate change;
- Zero carbon; and
- Culture change.

6.31 The implementation plans set out the actions to be delivered within a given five-year period, to make progress against the strategy's objectives and to undertake preparatory work that will enable progress to be made in future five-year periods. The actions in these plans are the strategic actions that will help to drive, enable and support Manchester's physical and cultural transformation to 2050 and beyond. Actions that are relevant to air quality include: Building: Policy B4: Identify and secure funding opportunities to invest in energy efficiency programmes, particularly focusing on fuel poverty challenges for the city's residents.

- Transport: Policy T1: Recognise the city's views and commitment to shift from private car use and make Manchester a walking and cycling city, aiming to secure £20 per person per year for the long-term investment.

### Greater Manchester Transport Strategy 2040 (TfGM, 2021a) and Our Five-Year Transport Delivery Plan 2021-2026 (TfGM, 2021b)

6.32 Greater Manchester Transport Strategy 2040 sets out a commitment to provide a transport system which:

- Supports sustainable economic growth and the efficient and effective movement of people and goods;
- Improves the quality of life for all by being integrated, affordable and reliable;
- Protects the environment; and
- Supports the net zero target as well as improving air quality.

6.33 The Transport Strategy has adopted a number of policies relevant to air quality, including the following:

- *"Policy 3: We will maintain a programme of interventions encouraging people to make sustainable journeys. We will support this programme through journey planning tools, and information to encourage travel behaviour change and mode shift, in order to make the most efficient use of available capacity (particularly during peak periods)."*
- *"Policy 9: We will work with partners and key stakeholders to bring nitrogen dioxide ($NO_2$) levels on local roads within legal limits, and to reduce levels of particulate matter."*
- *"Policy 16: We will work with partners to support a rapid transition towards low-emission vehicles in Greater Manchester, including developing a clear strategy on the Electric Vehicle Charging Infrastructure network required to provide greater confidence to residents and businesses to invest in electric vehicles."*

6.34 To achieve the long-term ambitions as set out in the Transport Strategy, the Our Five Year

6.35 Transport Delivery Plan is published to respond to the transport opportunities and challenges facing Greater Manchester, in parallel with the spatial planning processes over 2021-2026. The aim is to provide an integrated approach to transport and land use planning by identifying the strategic transport interventions required to deliver the scale of growth envisaged across Greater Manchester.

6.36 Improving air quality is one of the key areas for GMCA's investment and intervention in the 5-year plan. To do so, GMCA pledged to deliver:

"*a package of interventions forming the Clean Air Plan that are reasonably expected to reduce $NO_2$ concentrations to legal levels and have wider air quality benefits"*

### GMCA 5-year Environment Plan 2019-2024 (GMCA, 2019)

6.37 The 5-Year Environment Plan sets out the long-term vision and immediate actions for the environment. The plan includes key priorities for improving air quality and reducing emissions caused by travel, including reducing the necessary travelling distance, increasing public transport and active travel, phasing out fossil fuelled vehicles, establishing a zero-emission bus fleet and decarbonising road freight transport.

### GMCA Air Quality Action Plan (TfGM, 2016)

6.38 An air quality management area (AQMA) has been declared across the City of Manchester and encompasses all major roads within Greater Manchester owing to exceedances of the annual mean Air Quality Objective for nitrogen dioxide ($NO_2$). Thereby an Air Quality Action Plan (AQAP) has been produced by the GMCA, which outlines the mitigation measures and strategic approach to improve air quality within the city and surrounding boroughs. The seven targeted actions aimed at improving air quality, and specific mitigation measures, are outlined below:

- Actions for Managing New Development: Creation and management of a database of significant planning application and related air quality assessments;
- Actions for Freight Vehicles: Locations for potential distribution centres will be identified in the Greater Manchester Spatial Framework;

- Actions for Buses: Consideration and trial of a range-extender bus or other ultra-low emission vehicles, which can be implemented to the wider public transport strategy;
- Actions for Cycling: Improvement to the cycle networks focusing on safe green routes, away from areas of high pollution;
- Actions for Travel Choices: Appraisal of existing car sharing schemes and their impacts on modal shift. Use this information to expand existing schemes and inform future areas of focus;
- Actions for Car: Continual expansion of EV charging points through the Plugged-in-Places programme; and
- Actions for Information and Resources: More resource and investment to the Great Air Manchester website.

6.39 To report on the LAQM monitoring results and the progress of actions within the AQAP, the Annual Status Report (ASR) is produced in each calendar year in fulfilment of the statutory duties placed on local authorities under the Environment Act 1995.

### GM Clean Air Plan (GMCA, 2022)

6.40 The ten GM local authorities have been instructed by the government to bring $NO_2$ pollution levels within legal limits through a Clean Air Plan (CAP), featuring a GM-wide category C charging Clean Air Zone (CAZ). Despite the CAZ not being approved in the first phase, a new CAP without charging CAZ has been submitted and is due to undergo consultation in early 2023.

6.41 Since 2018, GM has carried out a separate air quality monitoring survey for the launch of the CAP. Together with LAQM monitoring, the two monitoring schemes provide a more thorough picture of the air quality condition across GM. Based on ASR 2021, the local authority monitoring network is composed of the following:

- Continuous automatic monitoring sites: There are currently 20 automatic air quality monitoring stations, 12 of which are located at the roadside; and
- Diffusion tubes: 446 sites are set up for LAQM purposes. In addition, 222 sites are set up for GM CAP monitoring and evaluation purposes.

## Assessment Methodology and Significance Criteria

### Baseline Study Methodology

6.42 Baseline data was gathered from the following sources:

- Manchester City Council (MCC) Air Quality Annual Status Report 2021;
- GMCA Clean Air Plan Monitoring results;
- DEFRA's national air quality background maps, reference year 2019;
- Baseline traffic flows (in Annual Average Daily Traffic (AADT)) supplied by the project transport consultant; and
- Department for Transport (DfT) Traffic Counts.

6.43 The baseline year of 2019 has been selected, as this is the most recent calendar year with full, uninterrupted and published air quality monitoring data freely available, that has not been affected by the COVID-19 pandemic. Monitoring results from 2022 are not published by the local authority yet; relevant data from 2020 and 2021 are atypical of the local air quality due to the regulations in response to the pandemic, and the impact this had on both travel patterns and monitoring regimes.

## Construction Assessment Methodology

6.44 Potential construction effects are assessed in accordance with the Institute of Air Quality Management (IAQM) guidance on the assessment of dust from construction (Holman, 2014). This document provides a methodology for assessing air quality impacts from earthworks, construction and trackout activities associated with development proposals such as the Proposed Development. The construction assessment methodology involves the following steps:

1. A screening assessment to identify the need for detailed assessment. Detailed assessment will be required where there is:
    - A human receptor within:
        - 350m of the Site boundary; or
        - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance(s).
    - An ecological receptor within:
        - 50m of the Site boundary; or
        - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance(s).
2. Assess the risk of dust impacts by:
    - Defining the potential dust emission magnitude;
    - Defining the sensitivity of the area; and
    - Assessing the risk of impacts. Criteria for defining the dust impacts are shown in Appendix 6.1.
3. Determine site-specific mitigation for each of the four possible construction activities; and
4. Examine residual effects to determine whether or not these are significant.

6.45 This assessment will focus on earthworks, construction, and trackout as demotion is out of the scope of the Proposed Development. IAQM guidance suggests that the significance of any adverse effects is reported post-mitigation, assuming all actions to avoid or reduce environmental effects are an inherent part of the development proposals being considered.

### Receptors

6.46 IAQM construction guidance describes a construction dust receptor as *"a location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust".*

6.47 In accordance with IAQM guidance, the principles applied to assess and classify the sensitivity of receptors are described in Appendix 6.1.

## Operational Assessment Methodology

6.48 Environmental Protection UK (EPUK) and the IAQM have published guidance (Moorcroft, 2017) considering air quality within the planning and development control process. This guidance includes criteria which identify when relevant operational impacts can be screened out as 'not significant' or require further assessment. Criteria applicable to this assessment are detailed in Appendix 6.2.

### Traffic Emissions

6.49 Road traffic emissions are considered in relation to the change in traffic due to the Proposed Development. The assessment also takes into account traffic flows associated with future committed developments.

6.50 Traffic data has been provided by project transport consultants (Arup), for roads that will experience an increase of more than 100 vehicles per day (annual average daily traffic (AADT)). Traffic data for roads that have been considered in the assessment are presented in Appendix 6.3.

6.51 Pollutant concentrations have been predicted at existing and proposed future receptor locations in the worst-case scenario using the dispersion model ADMS-Roads (v5). This model was developed by Cambridge Environmental Research Consultants (CERC) and can be used to assess the impact of vehicle emissions and industrial sources on local air quality. Unlike simpler spreadsheet screening tools, it can include parameters such as variable meteorological conditions, complex road networks (including the combined contribution of multiple road links on single sensitive receptors) and the capability of including the effects of complex terrain, atmospheric chemistry and street-canyon effects. The model is widely used by local authorities in the UK as part of their LAQM obligations.

6.52 This assessment considers traffic-related pollutant concentrations ($NO_2$, $PM_{10}$, and $PM_{2.5}$) at existing receptors in the vicinity of the Proposed Development. The assessment considers existing traffic flows on the local road network as well as the predicted change in traffic due to the Proposed Development.

6.53 Pollutant concentrations are predicted at receptors for the following assessment scenarios:

- 2019 Existing Baseline: establish existing baseline conditions and for model verification;
- 2024 Peak construction year Do nothing: traffic flows for a future baseline scenario of the peak construction year;
- 2024 Peak construction year Do something: traffic flows for a future baseline scenario of the peak construction year with flows from vehicles associated with the construction of the Proposed Development;
- 2026 Opening Year Do nothing: traffic flows for the earliest possible opening year without flows associated with the full operation of the Proposed Development; and
- 2026 Opening Year Do Something: traffic flows for the earliest possible opening year with flows associated with the full operation of the Proposed Development.

### Combustion Plant Emissions

6.54 Combustion plant emissions have been assessed qualitatively based on information supplied by the mechanical, electrical and plumbing (MEP) engineers of the project.

### Background Concentrations

6.55 The Defra website includes estimated background air pollution data for $NO_x$, $NO_2$, $PM_{10}$ and $PM_{2.5}$ for each 1km-by-1km OS grid square. Background pollutant concentrations are modelled from the reference year of 2018 based on ambient monitoring and meteorological data from 2018 and include projections for future years up to 2030.

### Meteorological data

6.56 Hourly sequential meteorological data from Manchester Airport for 2019 were used in the dispersion modelling. The data provides information on hourly wind speed, direction, and extent of cloud cover. A wind rose displaying wind speed and direction data is presented in Figure 6.1.

### Surface Roughness

6.57 Surface roughness is a key modelling parameter that represents the extent of mechanical turbulence in the atmosphere caused by the roughness of the ground over which the air is passing. A surface

roughness value of 1m was used in the study area, which represents 'cities, woodlands' and best reflects the local condition. A value of 0.5m was used at the meteorological measurement site which represents' parklands and open suburbia'.

### Model post-processing

6.58 The model has been used to predict the road contribution of $NO_x$, $PM_{10}$, and $PM_{2.5}$ at each human receptor location. These concentrations were adjusted following the verification process set out below. In order to derive $NO_2$ concentrations from modelled $NO_x$ levels, results were processed through the $NO_x$ to $NO_2$ calculator provided by the Defra LAQM Support website (Defra, 2020). This calculator predicts the component of $NO_2$ based on the adjusted road-$NO_x$ and the background $NO_2$.

### Model Verification

6.59 The ADMS-Roads model was used to assess traffic emissions generated by the Proposed Development. In order to ensure that ADMS-Roads accurately predicts local concentrations, it is necessary to verify the model against local measurements.

6.60 The full verification process has been outlined in Appendix 6.4. The final verification factor of 3.71 has been applied to the modelled road $NO_x$ concentrations for each receptor to provide adjusted concentrations, which are then added to background concentrations and process using the forementioned $NO_x$ to $NO_2$ calculator.

6.61 The modelled $PM_{10}$ and $PM_{2.5}$ concentrations have been adjusted by applying the verification factor calculated for road $NO_x$.

### Receptor Sensitivity

Human receptors

6.62 Operational impacts are considered at human receptor locations with relevant exposure to national air quality objectives, in line with LAQM TG22 (Defra, 2022). Air quality objectives are set below the concentrations at which more sensitive members of the public are observed to be adversely affected by the exposure; hence different averaging periods apply to various sensitive receptors (Table 6.2).

6.63 As any member of the public may be exposed to relevant receptors, they are all equally sensitive to exposure. Under a worst-case scenario, all receptors exposed to potential air pollution are considered highly sensitive.

Table 6.2 Receptor sensitivity principles: examples of where the air quality objectives should apply

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

| Averaging period | Objectives should apply at | Objective should generally not apply at |
|---|---|---|
| 24-hour mean | All locations where the annual mean objective would apply, together with hotels.<br><br>Gardens of residential properties. | Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term. |
| Hourly mean | All locations where the annual mean and 24 - hour mean objective apply. Kerbside sites (for example, pavements of busy shopping streets).<br><br>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.<br><br>Any outdoor locations where members of the public might reasonably expect to spend one hour or longer. | Kerbside sites where the public would not be expected to have regular access. |

### Exposure of Future Site Occupants to Poor Air Quality

6.64 The Proposed Development includes a hotel, where short-term air quality objectives would apply. Greater Manchester's AQMA has been declared owing to exceedances of the annual mean objective for $NO_2$, and the Greater Manchester AQMA boundary is based upon modelled isopleths that exceed 35µg/m$^3$, which considering the annual mean objective is 40µg/m$^3$, accounts for modelling uncertainties and can be regarded as a cautious approach. The proposed hotel location in relation to the AQMA is presented in Figure 6.2. As the hotel is located approximately 90m away from the AQMA (and even further from the roadside), it can be concluded that both short-term and long-term $NO_2$ objectives will be met at the hotel facade. Therefore, proposed sensitive uses will not exceed any relevant air quality objectives, and further detailed assessment has been scoped out on this basis.

## Determining Significance

6.65 The impact of the Proposed Development will be considered in relation to relevant air quality objectives due to reasons stated in the Operational Assessment Methodology section. The impact descriptors for individual receptors will be determined in accordance with the IAQM's significance criteria, as detailed in Table 6.3.

Table 6.3 IAQM air quality impact significance descriptors

| Long-term average concentration at receptor in assessment year | Change in concentration relative to AQO | | | | |
|---|---|---|---|---|---|
| | 0% | 1% | 2-5% | 6-10% | >10% |
| 75% or less of AQO | Negligible | Negligible | Negligible | Slight | Moderate |
| 76-94% of AQO | Negligible | Negligible | Slight | Moderate | Moderate |
| 95-102% of AQO | Negligible | Slight | Moderate | Moderate | Substantial |

| Long-term average concentration at receptor in assessment year | Change in concentration relative to AQO | | | | |
|---|---|---|---|---|---|
| | 0% | 1% | 2-5% | 6-10% | >10% |
| 103-109% of AQO | Negligible | Moderate | Moderate | Substantial | Substantial |
| 110% or more of AQO | Negligible | Moderate | Substantial | Substantial | Substantial |

6.66 An overall significant effect may not necessarily result from a few receptors with 'moderate' or 'substantial' impacts. Judgement on the overall significance of an effect must consider:

- Existing and future air quality in the absence of the Proposed Development;
- The extent of current and future population exposure to the impact; and
- The influence and validity of any assumptions adopted when predicting impacts.

6.67 In line with IAQM guidance, a significant impact will be reported for proposed sensitive receptors where air quality objectives are predicted to be exceeded. Mitigation measures are necessary for this situation to reduce exposure and avoid reporting significant residual effects.

## Baseline Conditions

### Current Baseline (2019)

#### Local Air Quality Management

6.68 An AQMA has been declared across Manchester city centre and surrounding arterial roads owing to consistent exceedances of the air quality objective for the annual average concentration of $NO_2$. These exceedances are predominantly due to pollution from road transport, which accounts for 65%[1] of the total $NO_2$ emission within Greater Manchester. This highlights that poor air quality is a persistent issue, and road transport substantially impacts local air quality conditions. Although the majority of the Site is not located within the AQMA, a small eastern portion of the Site is located within the AQMA declared along Alan Turing Way A6010 and Ashton New Rd A662, as shown in Figure 6.3.

#### Air Quality Monitoring

6.69 GMCA has established an extensive monitoring network for LAQM purposes and to support the Greater Manchester Clean Air Plan (GM CAP). According to the latest ASR (Clean Air Greater Manchester, 2021), GMCA has deployed 20 automatic monitoring sites and 446 non-automatic (diffusion tube) monitoring sites for LAQM. In addition, 222 non-automatic roadside monitoring sites have been operated for monitoring and evaluation purposes of GM CAP.

6.70 Automatic monitoring sites continuously measure concentrations of $NO_2$, $PM_{2.5}$, $PM_{10}$, and $SO_2$, with higher accuracy and temporal resolution. Non-automatic monitoring sites detect the ambient concentration of $NO_2$ with diffusion tubes analysed and replaced on a monthly basis.

6.71 $NO_2$ monitoring sites within approximately 3km of the Site and associated monitoring results are presented in Figure 6.4 and Table 6.4 respectively. The recorded annual average concentrations at most roadside monitoring sites in the baseline year (2019) exceeded the AQO level. In 2019, monitored $NO_2$ concentrations at MAN-J8 and MAN-1 were close to 60µg/m$^3$, implying the possibility of exceeding the short-term (hourly) $NO_2$ objective. There was a slight concentration reduction in 2020 across all

[1] GMCA (2019) Greater Manchester's Plan for Homes, Jobs and The Environment. Revised Draft. January 2019. https://www.greatermanchester-ca.gov.uk/media/1710/gm_plan_for_homes_jobs_and_the_environment_1101-web.pdf

monitoring sites, likely due to the COVID-19 pandemic and subsequent lockdowns affecting travel patterns. The overall increase in the subsequent year indicates that the pollution level is likely to return to pre-pandemic levels; however, there is some uncertainty regarding future travel habits and subsequent impacts on local air quality conditions.

Table 6.4 Monitoring results from sites in proximity to the Site

| Site ID | Monitoring survey | Site type | Distance from site (m) | Site classification | Annual average NO2 concentration (µg/m³ ) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2017 | 2018 | 2019 | 2020 | 2021 |
| MA95BNO | LAQM | Diffusion tube | 1010 | Roadside | - | - | **43.4** | 31.5 | 34.1 |
| MAN-H2 | CAP | Diffusion tube | 1488 | Roadside | - | - | **50.2** | 32.9 | 37.3 |
| MA28NO | LAQM | Diffusion tube | 1585 | Roadside | 38.5 | 37.1 | 36.1 | 26.4 | 29.4 |
| MA71NO | LAQM | Diffusion tube | 1620 | Roadside | **50.4** | **46.1** | **45.3** | 31.4 | 34.2 |
| MAN-M4 | CAP | Diffusion tube | 1740 | Roadside | - | - | **54.1** | 34.5 | **40.8** |
| MA86ANO | LAQM | Diffusion tube | 1760 | Roadside | 36.9 | 32.1 | 33.6 | 25.5 | 27.5 |
| MAN 3-2 | CAP | Diffusion tube | 1790 | Roadside | - | 37.1 | 36.2 | 27.1 | 29.3 |
| MA36NO | LAQM | Diffusion tube | 1830 | Roadside | 34.0 | 33.1 | 31.7 | 24.3 | 26.7 |
| MAN 3-1 | CAP | Diffusion tube | 1831 | Roadside | - | **41.3** | 39.2 | 29 | 31.7 |
| MAN 3-5 | CAP | Diffusion tube | 1973 | Roadside | - | **45.3** | **41.6** | 31.3 | 37.8 |
| MAN J-8 | CAP | Diffusion tube | 2090 | Roadside | - | - | **59.7** | **40.6** | **52** |
| MAN J-7 | CAP | Diffusion tube | 2100 | Roadside | - | - | **51.6** | 29.8 | 33.7 |
| MA96BNO | LAQM | Diffusion tube | 2100 | Roadside | - | - | **46.0** | 36.4 | **41.0** |
| TA17NO | LAQM | Diffusion tube | 2165 | Roadside | 36.4 | 31.1 | 34.1 | 26.6 | 28.7 |
| MAN3 | LAQM | Automatic Monitoring | 2424 | Urban Centre | 36 | 35 | 36 | 27 | 30 |
| MAN1 | LAQM | Automatic Monitoring | 2841 | Kerbside | **65** | **62** | **59** | 36 | **44** |

Figures in **bold** indicate where the long-term air quality objective has been exceeded (>40µg/m³)

Figures **underlined and bold** indicate where the short term (hourly) $NO_2$ objective is likely to be exceeded

6.72 The annual average $PM_{10}$ concentrations at the two automatic monitoring sites, MAN 3 and MAN 1, are below the AQO level (40µg/m³) in the recent five years (Table 6.5 and Table 6.6). No short-term $PM_{10}$ exceedance has been recorded at the two sites, apart from one instance at MAN 3 in 2017. The annual average $PM_{2.5}$ levels at both sites over the recent five years are well below the relevant AQO of 20µg/m³. Therefore, no further concerns result from baseline levels of $PM_{10}$ and $PM_{2.5}$.

Table 6.5 GM $PM_{10}$ automatic monitoring data

| Monitoring sites | Annual mean $PM_{10}$ concentration (µg/m³) | | | | | Number of 24-hourly mean $PM_{10}$ exceedances >50 µg/m³ (35 allowable) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2017 | 2018 | 2019 | 2020 | 2021 |
| MAN 3 | 13.4 | 14.2 | 14.2 | 11.9 | 12 | 1 | 0 | 0 | 0 | 0 |
| MAN 1 | 20 | 21 | 20 | 15 | 15 | 0 | 0 | 0 | 0 | 0 |

Table 6.6 GM $PM_{2.5}$ automatic monitoring data

| Monitoring sites | Annual mean $PM_{2.5}$ concentration | | | | |
|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 |
| MAN 3 | 8 | 11 | 12 | 8 | 9 |
| MAN 1 | 7.6 | 8.1 | - | - | 6.3 |

### Background Air Quality

6.73 Predicted 2019 background concentrations for $NO_2$, $PM_{10}$, and $PM_{2.5}$ have been obtained from the Defra website, as detailed in the Operational Assessment Methodology section, and are outlined in Table 6.7Table 6.. Annual mean background concentrations of the three pollutants are below relevant AQOs.

Table 6.7 Predicted Defra mapped 2019 background concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$.

| Pollutant | Annual mean background concentrations (µg/m³) (Grid centred at 386500, 398500) |
|---|---|
| | 2019 |
| Nitrogen dioxide ($NO_2$) | 19.7 |
| Particulate matter ($PM_{10}$) | 12.5 |
| Particulate matter ($PM_{2.5}$) | 8.2 |

## Future Baseline (2026)

### Future Background Concentrations

6.74 The Defra website includes estimated background air pollution data for $NO_x$, $NO_2$, $PM_{10}$, and $PM_{2.5}$ for each 1km-by-1km OS grid square. Background pollutant concentrations are modelled based on ambient monitoring and meteorological data from 2018. The website includes projections for future years up to 2030.

6.75 Future year projections are for pollutant concentrations to decrease owing to improvements in emission control measures and policies aimed at improving air quality, notably the Clean Air Plan. Estimated pollutant concentrations for the opening year 2026 in the OS grid square in which the Site lies (centred at 386500, 398500) are shown in Table 6.8.

Table 6.8 Predicted Defra mapped background concentrations of $NO_x$, $NO_2$ and $PM_{10}$ for 2026

| Pollutant | Annual mean background concentrations (µg/m³) (Grid centred at 386500, 398500) |
|---|---|
| | 2026 |
| Nitrogen dioxide ($NO_2$) | 15.5 |
| Particulate matter ($PM_{10}$) | 11.7 |

| Pollutant | Annual mean background concentrations (µg/m$^3$) (Grid centred at 386500, 398500) |
|---|---|
| | 2026 |
| Particulate matter ($PM_{2.5}$) | 7.6 |

### Existing/Future Pollution Sources

6.76 The Co-op Arena adjacent to the Site includes provision for the following combustion plant:

- 2 gas fired boilers (totalling 1200kW); and
- 2 emergency generators (totalling 1524kW).

6.77 Given the over 100m distance between the Co-op Arena and the Proposed Development (Figure 6.5), any impact resulting from emissions from the proposed combustion plant associated with the Co-op Arena is likely to be negligible and has therefore been scoped out of this assessment.

### Existing off-Site receptors

6.78 Existing human receptors within the study area at worst-case locations are presented in Figure 6.6 and Appendix 6.5. All residential human receptors have been modelled at 1.5m, as a worst-case assumption, to represent average breathing height. For receptors with a mixed use of commercial and residential purposes, the heights were assumed at 4.5m to model the lowest height for dwellings.

6.79 The modelled results, from the baseline scenario, are presented in Appendix 6.7. Baseline conditions at most human receptors were below air quality objectives of 40µg/m$^3$ for all considered pollutants, with the exception of the modelled $NO_2$ concentrations at 7 of the 124 receptors being slightly above air quality objectives. The highest baseline annual average $NO_2$ concentration is found at R86, at 46.4µg/m$^3$. This is most likely due to the receptor's proximity to a junction connecting two roads with high traffic flow (Alan Turing Way and Ashton Old Road).

## Meteorological Conditions

6.80 Manchester Airport meteorological station is located 15.6 km south of the Site. This meteorological station is the closest to the Site; therefore, it provides the most representative depiction of the conditions across the Site. As shown in Figure 6.1, the prevailing winds are from the south and southwest at speeds of between 2-4m/s.

# Identification and Evaluation of Significant Effects

## Construction

### Relevant aspects of the Proposed Development

6.81 The following activities will have the potential to impact local air quality through dust deposition/elevated $PM_{10}$ concentrations:

- Earthworks;
- Construction; and
- Trackout.

6.82 Demolition falls outside the scope of this ES, hence potential impacts from relevant activities are not considered. There is also potential for construction traffic emissions to worsen local air quality. A detailed dispersion modelling study has been undertaken to assess the air quality impact arising from construction vehicles in the peak construction year (2024).

### Potential Effects of Development and their Significance

6.83 This section presents the assessment of construction effects from the Proposed Development. The IAQM guidance criteria used to assess the potential impacts of construction activities are detailed in Appendix 6.1. The following steps explain the assessment in the context of the IAQM criteria.

Step 1: Screen the need for a detailed assessment

6.84 In accordance with screening criteria in the IAQM guidance (Holman, 2014), an assessment is required for the Proposed Development as sensitive receptors are located within 350m of the Site boundary.

Step 2A: Define the potential dust emission magnitude

6.85 IAQM dust emission magnitudes for relevant construction activities are shown in Table 6.9.

Table 6.9 Dust emission magnitude

| Activity | Dust emission magnitude |
|---|---|
| Earthworks | Large (site area >10,000m$^2$) |
| Construction | Large (total building volume >100,000m$^3$) |
| Trackout | Medium (10-50 HDV outward movements in any one day) |

Step 2B: Define the sensitivity of the area

6.86 The sensitivity of the surrounding area is defined using a number of factors, including receptor sensitivity, number of receptors, distance from the Site, and existing $PM_{10}$ concentrations. The sensitivity of the surrounding area to potential construction impacts is shown in Table 6.10.

6.87 Construction activities are most likely to affect the following human receptors: off-Site residential properties, sports facilities, and car parks surrounding the Site, as shown in Figure 6.7. In determining the sensitivity of the surrounding area, neighbouring cumulative schemes are taken into account, as they would be occupied while the Proposed Development is under construction.

6.88 The area's sensitivity to dust soiling due to all four activities is assessed to be medium due to the 'medium' to 'low' sensitivity of receptors in close proximity to the Site, and the relatively far distance of highly sensitive receptors to the planned construction area.

6.89 The sensitivity to human health impacts is considered to be low owing to the existing low $PM_{10}$ concentrations.

Table 6.10 Sensitivity of surrounding receptors

| Potential Impact | Sensitivity Of the Surrounding Area | | |
|---|---|---|---|
| | Earthworks | Construction | Trackout |
| Dust Soiling | Medium | Medium | Medium |
| Human Health | Low | Low | Low |

Step 2C: Define the risks of impacts

6.90 The risk of dust impacts for relevant construction activities is summarised in Table 6.11. These results consider both the potential dust emission magnitude and the area's sensitivity. Results show that the impact is regarded as high risk; however, it is acknowledged these activities are temporary in nature and will be mitigated through implementation of good industry practices, appropriate to the level of risk.

6.91 Appropriate mitigation measures set out in Appendix 6.8 reduce the impacts of construction activities and ensure any residual effects are not significant.

Table 6.11 Risk of impact

| Potential Impact | Construction activities | | |
|---|---|---|---|
| | Earthworks | Construction | Trackout |
| Dust Soiling | Medium Risk | Medium Risk | Low Risk |
| Human Health | Low Risk | Low Risk | Low Risk |

### Construction Traffic Emissions

6.92 Vehicle emissions from construction traffic during the construction phases of the Proposed Development will have a potential impact on local air quality.

6.93 This section outlines the air quality impacts of construction traffic on existing receptors. Predicted pollutant concentrations, both with and without the Proposed Development in place, at existing receptors are presented in Appendix 6.6. The contribution from traffic emissions has been verified following the methodology outlined in the Operational Assessment Methodology – Model Verification section.

6.94 The impact of construction traffic emissions associated with the Proposed Development is predicted to be negligible at all existing receptors. Concentrations of all pollutants modelled ($NO_2$, $PM_{10}$ and $PM_{2.5}$) at the majority of existing receptors are expected to marginally increase as a result of construction traffic flow; however, these increases are less than 0.2% of the relevant air quality objectives across all existing receptors for all pollutants, and as such demonstrates a negligible and therefore not significant impact.

6.95 The highest increase in annual mean $NO_2$ concentrations is predicted at receptors R19 by 0.01µg/$m^3$ due to construction vehicle emissions. This is well below the pollutant increase that would indicate a significant impact.

6.96 Regarding short-term air quality objectives as a result of the construction road traffic emissions, in accordance with LAQM TG16, it is considered that the pollution levels at all existing receptors comply with the hourly objective as the long-term $NO_2$ concentrations are below 60µg/$m^3$.

6.97 Particulate matter concentrations were also modelled within this assessment. As with $NO_2$ concentrations, PM concentrations increased slightly at all existing human receptors. The highest increase of $PM_{10}$ is predicted to be at R64, with an increase of 0.014µg/$m^3$; R16 is expected to experience the most significant increase of $PM_{2.5}$, by 0.002µg/$m^3$. The increase in annual average daily traffic (AADT) and heavy-duty vehicles (HDV) flows on Alan Turing Way contributed to the pollution level increase at the two receptors. The magnitudes of the increases are considered negligible in line with IAQM guidance; therefore, the construction impacts on air quality at all receptors are negligible and relevant effects are deemed not significant.

## Operation

### Relevant Aspects of the Proposed Development

6.98 This section presents the assessment of operational effects from the Proposed Development, i.e., the 'existing Site with Proposed Development' scenario.

6.99 The following operational aspects have been scoped into the assessment in order to determine their likely impact on local air quality:

- The proposed combustion plant and energy strategy; and
- Assessment of the impact of operational traffic emissions, on existing sensitive receptors.

### Combustion Plant Emissions

6.100 Space heating/cooling for the Proposed Development, and water heating for the North Stand (except toilets) and the hotel will be met through air-source heat pumps. Electric water heaters will be provided for the commercial building and toilets in the North Stand, where the hot water demand is expected to be low. The required electricity will be supplied from off-Site power plants; although emissions could potentially be generated at the power plants, the electric water heaters would not produce pollution in proximity to the Site. Therefore, meeting the typical heating and hot water demand will not lead to any on-site emissions.

6.101 Three diesel generators are proposed for use in the event of a loss of main power and testing. Two 100kW generators will be installed for the hotel and commercial building, whilst one 250kW generator will be installed in the North Stand. The two hotel and commercial building generators will be situated at roof level, and the flues will terminate vertically, 1.7m above roof level. The North Stand generator will be located in the level 3 plantroom, with the generator exhaust flue terminating horizontally from the east elevation of the core at the height of 79.25m. Generator testing for the hotel and commercial building is anticipated to be 20 minutes per month (4 hours per year). The North Stand generator will run 20 minutes before each game or event, totalling approximately 8 hours annually.

6.102 Due to the limited hours of emergency generator usage and the separation of the generator flues from existing and proposed receptors, the impact of generator emissions on air quality will be negligible. Therefore, the impact of combustion plant emissions associated with the Proposed Development is anticipated to be negligible and relevant effects are deemed not significant.

### Potential Effects of Development and their Significance

#### Operational traffic emissions

6.103 Vehicle emissions from the operational traffic associated with the Proposed Development have the potential to impact local air quality. This section outlines the predicted air quality impact from these emissions at sensitive receptors.

6.104 The contribution from traffic emissions has been verified and processed following the methodology outlined in the Operational Assessment Methodology – Model Verification section, with the 2019 recorded concentration, 2019 background concentration, Defra's emission factor toolkit v.11 (EFT) (Defra, 2021), and the Defra $NO_x$ to $NO_2$ calculator (Defra, 2020) to give the total predicted concentrations.

6.105 The assumption of background concentration to be at the 2019 level is a conservative approach. Given the uncertainty in future air quality conditions, it is assumed that there will be no improvement in background concentrations from 2019, for all future assessment years.

6.106 Emission factors from the earliest operating year (2026) have been obtained from Defra's EFT and used in the dispersion model. This approach would accurately reflect the pollution level in future scenarios without the risk of underestimation, as studies indicate that Defra's EFT provides an accurate prediction of the most likely future vehicle emissions reductions and may even under-predict the rate of vehicle emissions reduction (Gellatly, et al., 2020).

#### Existing sensitive receptors

6.107 According to the predicted traffic flow provided by project traffic consultants, increases in AADT are expected to take place on several road links in proximity to the Proposed Development. Alan Turing Way is predicted to experience the largest increase in AADT, with over 800 vehicles per day due to the Proposed Development.

6.108 With the worst-case assumption, 124 sensitive receptors in close proximity to the roads with significant traffic increases are considered in the dispersion model. The receptors are either located within AQMAs or in the vicinity of AQMAs. Most of the receptors are at building facades of nearby residential properties, as well as other locations where members of the public might be regularly exposed, such as schools and general practice surgeries.

6.109 Predicted pollutant concentrations, both with and without the Proposed Development in place, at existing sensitive receptors are presented in Appendix 6.7. The impacts of operational traffic emissions associated with the Proposed Development are predicted to be negligible at all existing receptors. Concentrations of all modelled pollutants ($NO_2$, $PM_{10}$, and $PM_{2.5}$) at all existing sensitive receptors are expected to increase marginally due to the operational traffic. While the concentration increases are less than 0.5% relevant to the air quality objectives for $NO_2$, and less than 0.2% for $PM_{10}$ and $PM_{2.5}$, the impacts are deemed negligible.

6.110 The highest increases in annual mean $NO_2$ are predicted at receptors R86, R85, and R64, with increments of 0.17μg/$m^3$, 0.15μg/$m^3$, and 0.14μg/$m^3$ respectively. Receptors R86 and R85 are located by the junction of Ashton Old Road and Alan Turing Way; traffic flows on the two road links are expected to increase by 291 and 899 vehicles per day respectively. Due to the combined effects of the two roads, R86 and R85 are projected to experience relatively high concentration increases. The increase in traffic flow at Alan Turing Way is also the primary reason behind the slight concentration rise at R64, in combination with its proximity to the main road.

6.111 Despite the relatively substantial predicted traffic increases, the expected annual average $NO_2$ concentrations at the three receptors mentioned above in the earliest operation year (2026) are 33.6μg/$m^3$, 32.8μg/$m^3$, and 27.4μg/$m^3$ respectively, with the Proposed Development. The predicted concentrations are lower than both the baseline concentration at the three receptors (2019) and the air quality objectives of 40μg/$m^3$ for annual average $NO_2$ concentration.

6.112 The annual average $NO_2$ concentration of 33.6μg/$m^3$ at R86 is also the highest among all existing receptors, which is well below the threshold of 60μg/$m^3$ for the likely exceedance of the hourly AQO set out in LAQM TG22. Therefore, all existing receptors are expected to meet the short-term $NO_2$ concentration objective.

6.113 The most significant increases in $PM_{10}$ and $PM_{2.5}$ concentrations are expected to occur at R64 due to reasons detailed above. The 0.05μg/$m^3$ and 0.03μg/$m^3$ concentration increase for the two pollutants are considered negligible in line with the IAQM guidance, hence the impact is deemed not significant. The resultant concentrations ($PM_{10}$:14.9μg/$m^3$, $PM_{2.5}$: 9.9μg/$m^3$) are also well below the AQO.

6.114 Overall, the impact of emissions from operational traffic on existing receptors will be negligible; therefore, the effects are not significant.

### On-Site receptors

6.115 Given the proposed receptor locations are outside the AQMA and the distance from the building facade to nearby roads is approximately 90m. Hence the pollution level experienced by on-Site receptors is scoped out from the modelling study. In addition, modelling results indicate that the on-Site pollution level in the baseline year is well below the national air quality objectives, and the impact of the Proposed Development is negligible as detailed above. Considering the expected year-on-year air quality improvement due to the development in emission abatement technology and enhancement in national fleet composition, the effects of on-Site air quality are deemed not significant.

### Summary of Effects

Table 6.12 Summary of effects during operation

| Receptor | Sensitivity | Description of effect | Magnitude of change/impact | Effect significance |
|---|---|---|---|---|
| Existing residential | High | Increase in ambient pollutant concentrations in the local area associated with operational traffic emissions | Negligible | Not significant |
| Existing healthcare facilities | High | Increase in ambient pollutant concentrations in the local area associated with operational traffic emissions | Negligible | Not significant |

## Climate Change in-combination Effects

### Construction

6.116 The construction period is planned to last until 2026. Although climate forecasts show that as a result of climate change, Manchester is likely to experience marginally higher temperature all year around (less than 2°C), and slightly wetter winters and drier summers; this time frame is not significant, and current climatic conditions are considered representative of the climate during the construction period.

6.117 Therefore, based on the current climate forecasts during the construction period and the construction timeframe, there is no need for specific adaptation measures to reduce the risk from climatic effects during construction. There may be an increased risk of extreme weather events, and prudence must be taken during construction to be aware of local forecasts and allow flexibility in the approach to construction work as appropriate at the time. Specifying adaptation measures at this stage is not deemed necessary.

### Operation

6.118 The Proposed Development is expected to be completed and fully operational by 2026. Climate forecasts looking beyond this time predict that by 2080 the northwest of England will likely experience an approximately 5°C increase in winter mean temperature, and a 7-8°C increase is expected for summer mean temperature. The higher temperature would promote the generation of certain pollutants, such as ozone. However, as the ozone generation process proceeds, $NO_2$ concentrations decrease as it is one of the precursors in ozone formation. Therefore, the impacts of climate change by 2080 do not necessarily increase the risk of worsening air quality. With the expected year-on-year pollution level reduction, as detailed in the Potential Effects of Development and their Significance – on-site receptors section, the air quality at the Proposed Development and off-site receptors by 2080 should be able to meet the current standards. It is thus considered that the assessment carried out will remain fit for purpose, and mitigation measures proposed would ensure no significant effects are likely to occur.

## 2014 Extant Consent

6.119 Whilst there is an extant consent from 2014 to extend the North Stand, which could be considered as part of the future baseline, IAQM guidance is clear that where such consent exists, the air quality assessment should be carried out against the current baseline and any extant consent disregarded in order to reflect real-world conditions. IAQM guidance states:

*" In some circumstances, there will be an existing permission for development on the site that has not yet been exercised. In the planning system, the estimated emissions from the existing permission could be considered as part of the future baseline and thus a revised application for the site would give rise to an*

*incremental change emission from that associated with the extant permission. This guidance recommends that impacts be assessed for the new permission sought against the current baseline for the site, disregarding the extant permission; this will reflect the 'real world' increase experienced by receptors."*

## Mitigation Measures

### Construction Site-specific Dust Mitigation Measures

6.120 Following the framework outlined in the Step 3 of the IAQM guidance on dust assessment, mitigation measures presented in Appendix 6.8 will be incorporated into the Proposed Development to ensure that the residual effects from construction are not significant; the proposed mitigation measures are based on the industry good practice.

## Operation Mitigation Measures

6.121 No mitigation measures required as no adverse effects identified during operation of the Proposed Development.

## Cumulative Effects

### Construction

6.122 IAQM guidance indicates that with appropriate mitigation measures in place, the impact from construction dust will not be significant. The guidance also suggests that cumulative effects may occur from sites within 500m of one another. In line with proposed mitigation measures, the contractor should hold regular liaison meetings with other high-risk construction sites within 500m of the Site boundary, to ensure plans are coordinated, and dust and particulate matter emissions are minimised.

6.123 It is assumed that an appropriate assessment of potential construction effects will have been carried out for cumulative schemes, and necessary mitigation will have been identified. Mitigation for this Proposed Development will complement the mitigation identified for the other cumulative developments and ensure that overall impacts are negligible.

6.124 Any residual cumulative impacts should be mitigated through open communication with nearby construction sites, a recommended mitigation measure.

6.125 With the implementation of recommended mitigation, no residual cumulative effects are expected.

### Operation

6.126 As all cumulative schemes have been included within the traffic data for the Proposed Development, the cumulative effects during operation are considered inherently within the assessment. The results from the operational phase assessment indicate cumulative air quality impacts are negligible at all receptors.

## Residual Effects

Table 6.13 Summary of receptors, likely significant effects, mitigation measures, and residual effects.

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| Receptors sensitive to construction dust impacts | Medium risk of impacts from dust and emissions during construction, leading to potential disamenity/nuisance | Mitigation measures proposed in line with good practice to ensure dust and emissions | With effective implementation of recommended mitigation the residual effect is likely to be not significant |

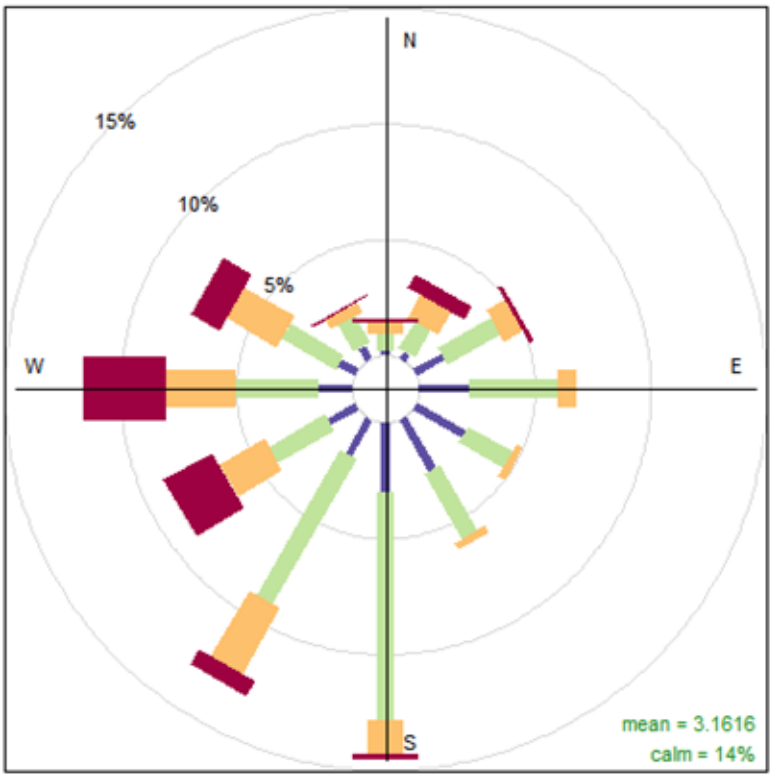
| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | | during construction are minimised | |
| **Operation** | | | |
| Air quality sensitive receptors | No significant effects predicted | No mitigation measures required | Not significant |

## Reference List

6.127 This ES Chapter has been prepared with reference to the following:

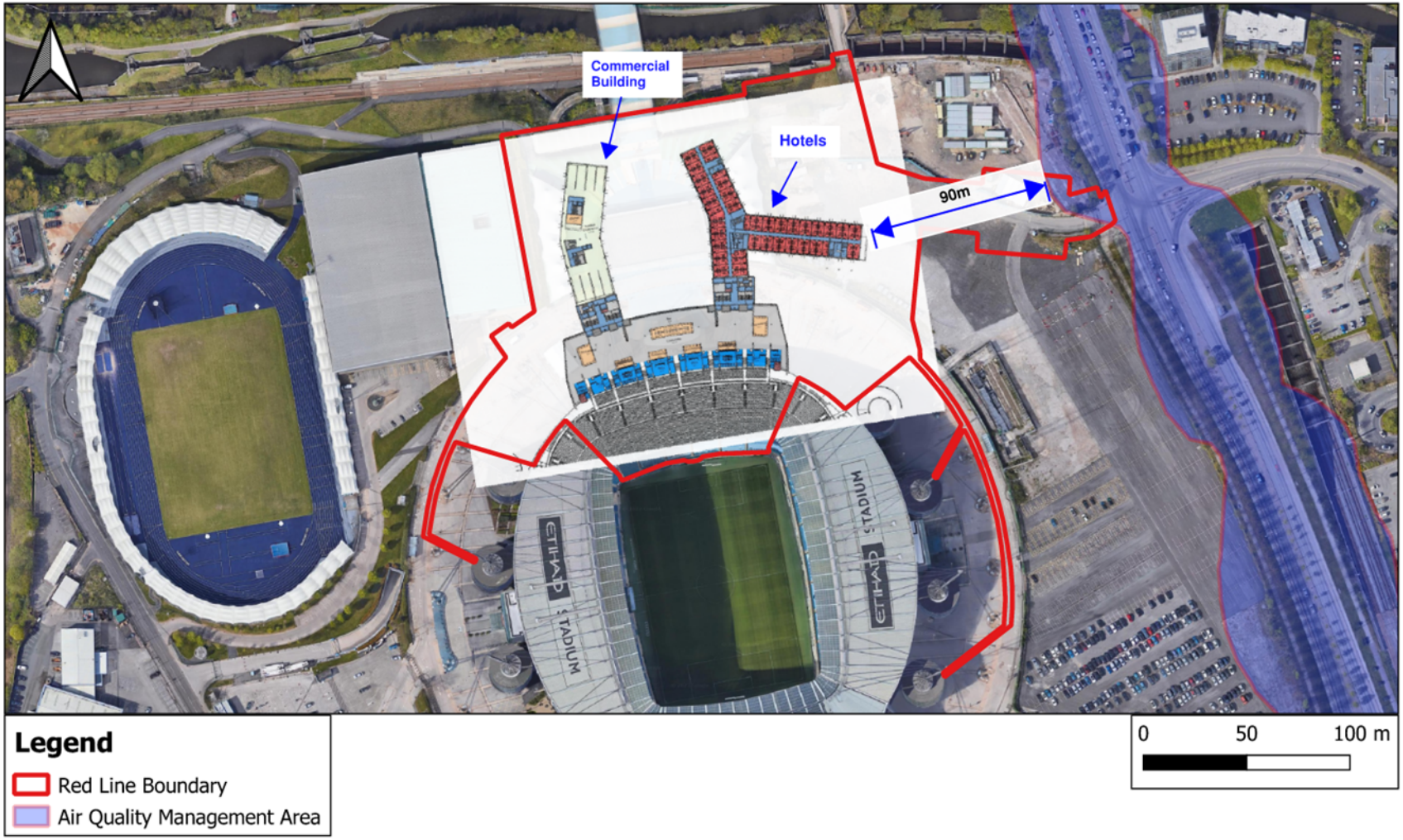

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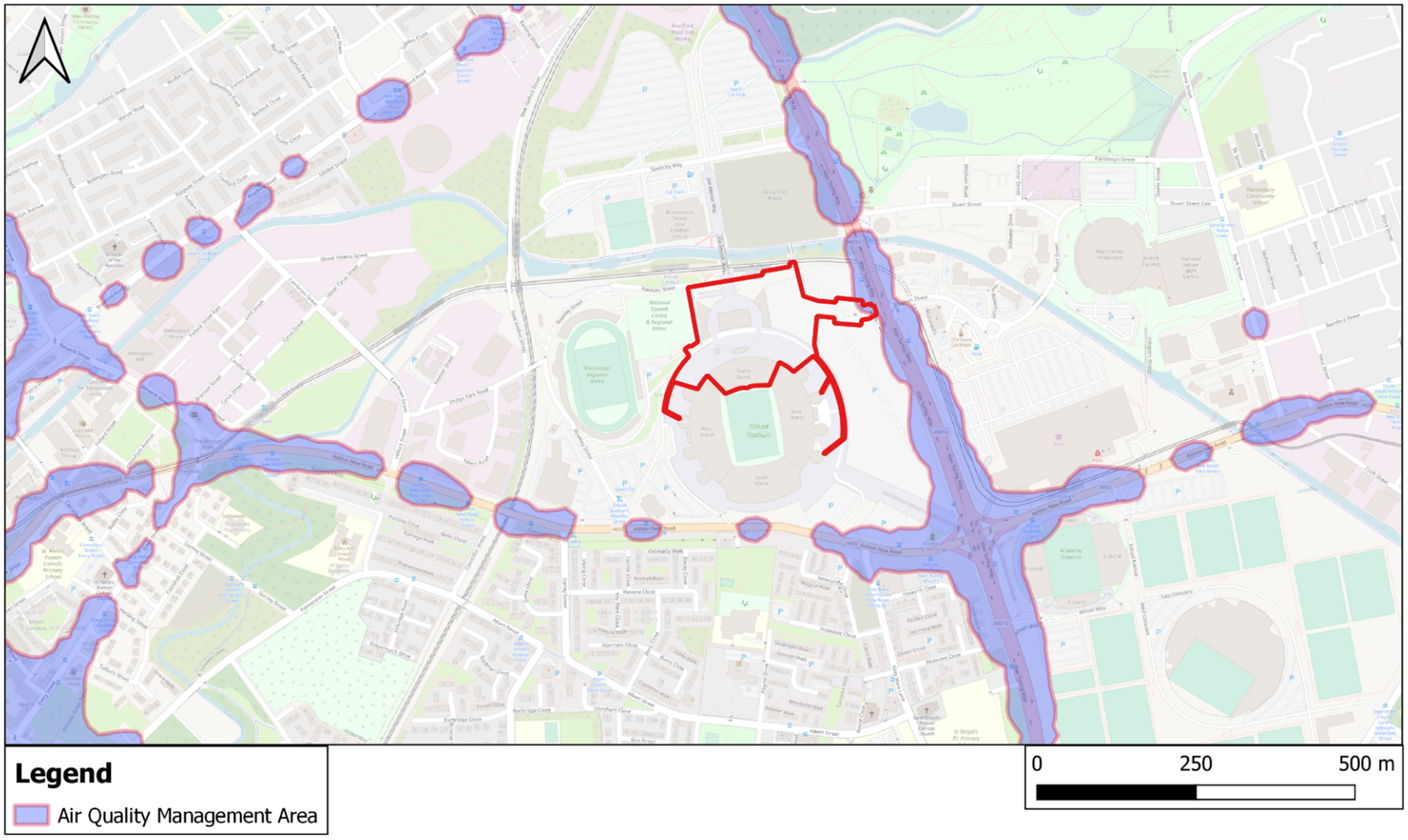



**Frequency of counts by wind direction (%)**

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **6.1** | | |
| | **Title:** | **Wind rose from Manchester Airport meteorological station 2019** | | |
| | **Project:** | **North Stand Manchester** | | |
| | **Date:** | **06/04/2023** | **Scale:** | **NTS** |

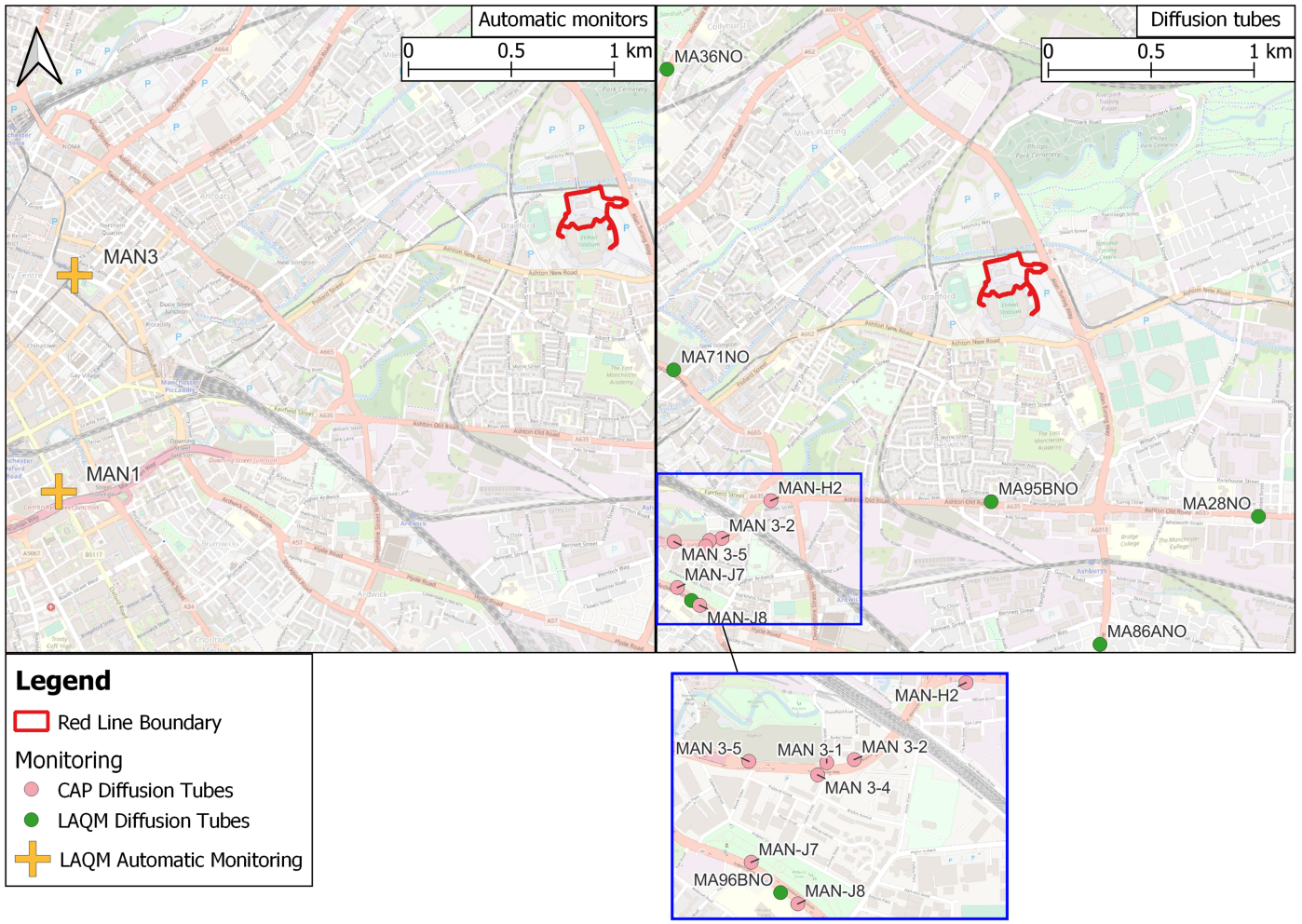



| | | | | |
|---|---|---|---|---|
| | **Figure:** | **6.2** | | |
| | **Title:** | **Location of proposed hotel relative to the AQMA** | | |
| | **Project:** | **North Stand Manchester** | | |
| | **Date:** | **06/04/2023** | **Scale:** | **Scale** |




| | |
|---|---|
| **Figure:** | **6.3** |
| **Title:** | **Air quality management areas in proximity to the Site** |
| **Project:** | **North Stand Manchester** |

| | Date: | 06/04/2023 | Scale | Scale |
|---|---|---|---|---|



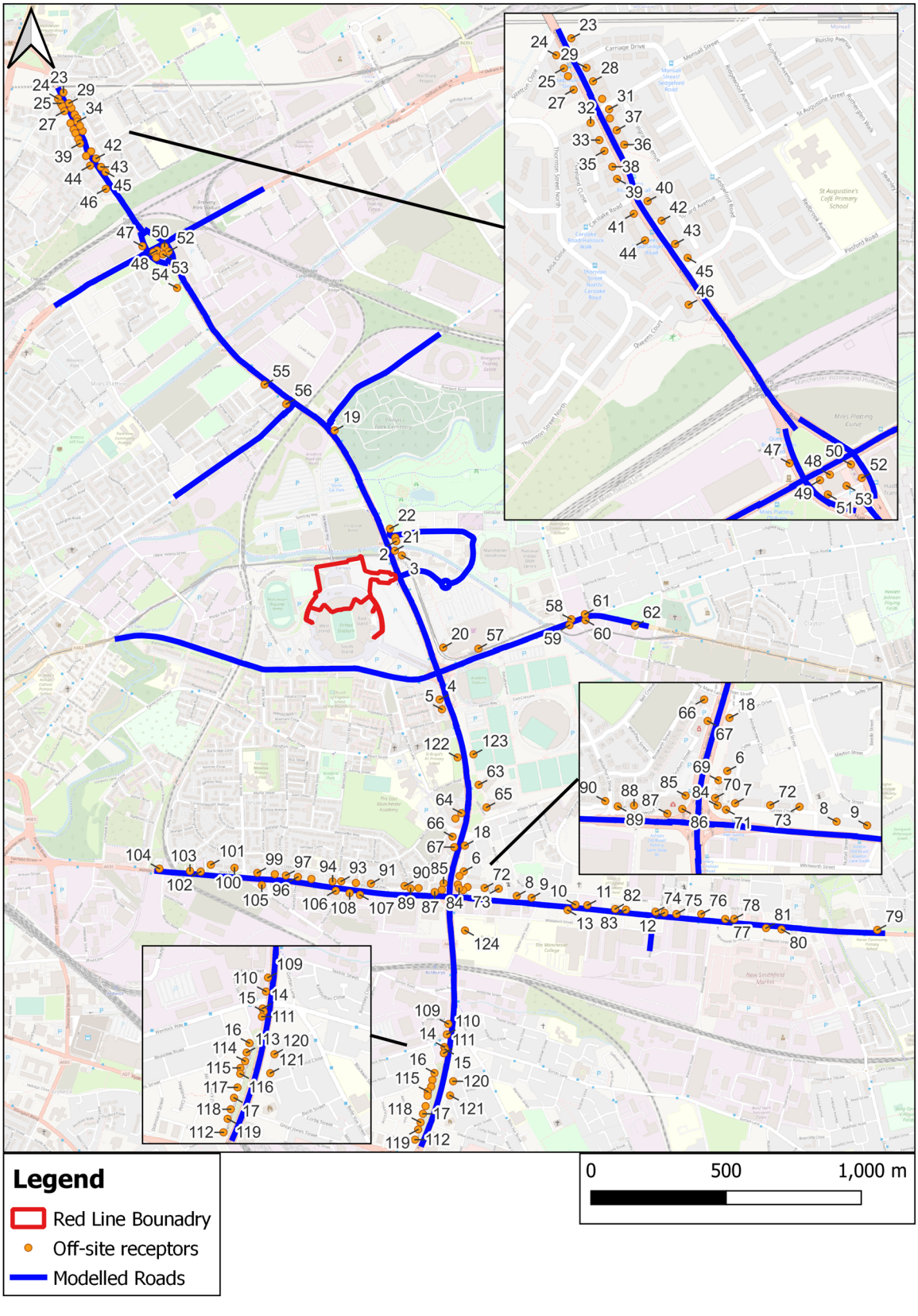

| | Figure: | 6.4 |
|---|---|---|
| | Title: | Local authority monitoring locations |

| | | | | |
|---|---|---|---|---|
| | **Project:** | **North Stand Manchester** | | |
| | **Date:** | **06/04/2023** | **Scale:** | **Scale** |

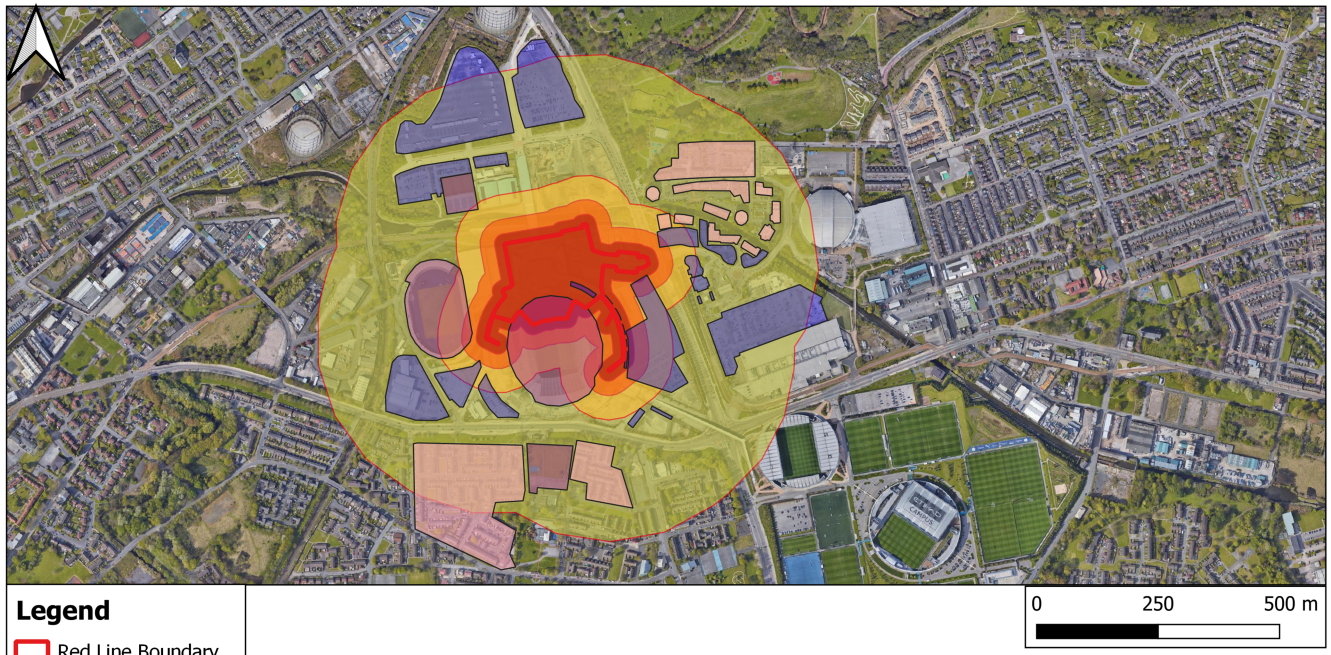



| | |
|---|---|
| **Figure:** | **6.5** |
| **Title:** | **Combustion plant proposed in Co-op Arena** |
| **Project:** | **North Stand Manchester** |

| | | | | |
|---|---|---|---|---|
| | **Date:** | **06/04/2023** | **Scale:** | **Scale** |




| | | | |
|---|---|---|---|
| **Figure:** | **6.6** | | |
| **Title:** | **Modelled human receptors and road layout** | | |
| **Project:** | **North Stand Manchester** | | |
| **Date:** | **06/04/2023** | **Scale:** | **Scale** |




| | | | | |
|---|---|---|---|---|
| | **Figure:** | **6.7** | | |
| | **Title:** | **Construction context and surrounding receptors** | | |
| | **Project:** | **North Stand Manchester** | | |
| | **Date:** | **06/04/2023** | **Scale:** | **Scale** |

# 7. Greenhouse Gas Emissions

## Introduction

7.1. This Chapter of the ES has been prepared by Buro Happold and assesses the likely greenhouse gas (GHG) impacts of the proposals upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

7.2. This Chapter is accompanied by one technical appendix, Greenhouse Gas Calculation Inputs (appendix 7.1).

| Technical Competence in Greenhouse Gas Emissions and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Charlotte Ainsworth | Tom Peacock |
| Company | Buro Happold | Buro Happold |
| Qualifications/Accreditations relevant to technical area | BSc Geography<br><br>MSc Climate Change | BSc Geography<br><br>MSc Sustainability and Consultancy |
| Does the practitioner hold any IEMA qualification? | Graduate IEMA membership | Practitioner IEMA membership |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 1 | 4 |
| Number of EIA's delivered to date | 5 Greenhouse Gas ES Chapters | 10 Greenhouse Gas ES Chapters completed. Project management of 3 EIAs. |

## Limitations and Assumptions

7.3. When calculating GHG emissions associated with the construction and operation of the Proposed Development, outputs of the Carbon Lifecycle Assessment and Energy Assessment have been used. Whilst this has given the best estimate of the scale of GHG emissions associated with the Proposed Development, they will not be completely accurate due to assumptions made which may differ from construction and operational practices. Additionally, where there is uncertainty, the worst-case scenario has been taken.

## Legislative and Policy Context

### Legislation

The Climate Change Act 2008 (2050 Target Amendment) (Order 2019)

7.4. The Climate Change Act 2008 originally required the UK to reduce carbon emissions by at least 80% by 2050 compared to a 1990 baseline. On 27th June 2019, the UK Government increased the statutory duty of the Secretary of State to at least a 100% reduction in carbon emissions by 2050. Doing so would make the UK a 'net zero' emitter.

## National Planning Policy

### Town and Country Planning (EIA) Regulations 2017

7.5. Schedule 4, paragraph 5(f) of the EIA Regulations state that an EIA is to consider the following in relation to climate change:

7.6. *'A description of the likely significant effects of the development on the environment resulting from, inter alia… the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change'.*

### National Planning Policy Framework (NPPF) (MHCLG, 2021)

7.7. The NPPF states the following at paragraph 153 in relation to GHG emissions:

7.8. *'In determining planning applications, local planning authorities should expect new development to:*

- Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.'

### National Planning Practice Guidance (NPPG) (MHCLG, 2021)

7.9. The Climate Change Guidance states the importance of planning to consider climate change, stating the following:

- *'Effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. In doing so, local planning authorities should ensure that protecting the local environment is properly considered alongside the broader issues of protecting the global environment. Planning can also help increase resilience to climate change impact through the location, mix and design of development.'*

### The Building Regulations 2021

7.10. Building Regulations Part L1A and Part L2A set out minimum legal requirements for energy efficiency in residential (Part L1A) and non-residential (Part L2A) building construction. These regulations are typically updated every 3 years with new minimum performance benchmarks set. All buildings in the Proposed Development will have to comply with the relevant version of Part L.

## Sub-Regional Planning Policy (where relevant)

### Places for Everyone, Joint Development Plan – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan. Publication Stage (GCMA, 2021)

7.11. Although this plan is yet to be adopted, the consultation period has finished, and the NPPF provides guidance on the weight that should be given to emerging policies, stating the following:

*'Local planning authorities may give weight to relevant policies in emerging plans according to:*

- *the stage and preparation of the emerging plan (the more advanced its preparation, the greater the weight that may be given)'*

7.12. The following policies in the joint development plan are of relevance to GHG emissions:

7.13. Policy JP-S 1 Sustainable Development states the following:

*'To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.*

*Preference will be given to using previously-developed (brownfield) land and vacant buildings to meet development needs'*

7.14. Policy JP-S 2 Carbon and Energy states the following:

*'The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:*

1. *Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;*
2. *Promoting the use of life cycle cost and carbon assessment tools to ensure the long term impacts from development can be captured;*
3. *Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;*
4. *Keeping fossil fuels in the ground;*
5. *Planning for a balanced and smart electricity grid by identifying geographical locations which could support energy assets;*
6. *Increasing the range of nature based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;*
7. *Development of Local Area Energy plans to develop cost effective pathways to achieve carbon targets;*
8. *An expectation that new development will:*
    a. *Be net zero(31) carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:*
        i. *Minimise energy demand;*
        ii. *Maximise energy efficiency;*
        iii. *Utilise renewable energy;*
        iv. *Utilise low carbon energy; and*
        v. *Utilise other energy sources.*
    b. *Incorporate adequate electric vehicle charging points to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;*

*c. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;*
*d. Achieve energy demand reductions for residential development in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation.*

*For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.*

*e. For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.*
*f. Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.'*

7.15. Policy JP-S 7 Resource Efficiency states the following:

*'The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help to achieve this:*

*Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.'*

## Local Planning Policy

### Manchester's Local Development Framework. Core Strategy Development Plan Document (MCC, 2012)

7.16. The Core Strategy was adopted in July 2012, and includes the following spatial objectives relating to the reduction of GHG emissions:

- SO1. Spatial Principles: Provide a framework within which the sustainable development of the city can contribute to halting climate change; and
- SO6. Environment: Protect and enhance both the natural and built environment of the city and ensure the sustainable use of natural resources, in order to mitigate and adapt to climate change, support biodiversity and wildlife, improve air, water and land quality, recreational opportunities and provide networks of high-quality green infrastructure, ensuring that the city is inclusive and attractive to residents, workers, investors and visitors.

7.17. Policies relevant to GHG emissions are set out below:

7.18. Policy EC 1 Employment and Economic Growth in Manchester states the following:

7.19. *'Development proposals should have regard to:*

- Climate change resilience demonstrating how $CO_2$¬ emissions will be minimised with an aim of zero carbon emissions, through energy efficiency, renewable energy and contributing to low and zero carbon decentralised energy infrastructure.'

7.20. Policy C2 District centres states the following:

7.21. *'New development should deliver improvements to the quality and accessibility of the centre environment. Opportunities should be taken to adopt sustainable building design and practices to assist in adapting to climate change.'*

7.22. Policy EN 4 Reducing CO2 Emissions by Enabling Low and Zero Carbon Development states the following

7.23. *'The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in $CO_2$ emissions, and rising fossil fuel prices, through the following actions:*

- *All development must follow the principle of the Energy Hierarchy, being designed;*
  - *to reduce the need for energy through design features that provide passive heating, natural lighting and cooling;*
  - *to reduce the need for energy through energy efficient features such as improved insulation and glazing; and*
  - *to meet residual energy requirements through the use of low or zero carbon energy generating technologies.*
- *Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies;*
- *Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings;*
- *Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing/potential decentralised energy schemes; and*
- *The use of building materials with low embodied carbon in new development and refurbishment schemes.'*

7.24. Policy EN 6 : Target Framework for CO2 reductions from low or zero carbon energy supplies states the following:

7.25. *'Applications for residential development of 10 or more units and all other development over 1,000 sqm will be expected as a minimum to meet the target shown in Table 7.1 and Table 7.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated $CO_2$ emissions for all phases of the development.'*

7.26. *'The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows*

- *Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).*
- *Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.*
- *Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.'*

Table 7.1 – Domestic $CO_2$ emissions reduction targets, (Core Strategy Development Plan, 2012)

| Target | % Minimum requirement |
|---|---|
| Target 1: Network development area | CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010 |
| Target 2: Electricity intense buildings | +15% increase on Part L 2010 |
| Target 3: Micro generation area | +15% increase on Part L 2010 |

Table 7.2 – Non-domestic $CO_2$ emissions reduction targets, (Core Strategy Development Plan, 2012)

| Target | % Minimum requirement |
|---|---|
| Target 1: Network development area | CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010 |
| Target 2: Electricity intense buildings | +10% increase on Part L 2010 |
| Target 3: Micro generation area | +15% increase on Part L 2010 |

7.27. *'The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with $CO_2$ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.'*

7.28. Policy EN 8 Adaptation to Climate Change states the following:

7.29. *'Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with $CO_2$ mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.'*

### Manchester City Council Climate Change Action Plan 2020 – 2025

7.30. The Manchester City Council (MCC) Climate Change Action Plan sets out MCC's commitments to tackling climate change from 2020-2025 and builds on previous plans over the last decade.

7.31. It summarises the specific actions which are required to ensure that MCC reduces its direct emissions by at least 50% by 2025 (compared to 2019/20) whilst also playing its full part in supporting and influencing the city to do the same.

7.32. The purpose of the plan is as follows:

*"The document sets out MCC's commitments to tackling climate change over the next 5 years and builds on previous action plans over the last decade; and*

*It covers MCC's plans for adapting to the expected impacts of climate change and supporting and influencing others, including through the implementation of the Manchester Green and Blue Infrastructure Strategy 2015-2025"*

7.33. Specific commitments that MCC are making are:

*'Deliver at least a 50% reduction in carbon emissions from our buildings, energy and transport by 2025 (from circa 30-32,000 tonnes in 2019/20 to circa 15-16,000 tonnes in 2024/25) via a 13% year on year reduction;*

*Report quarterly on progress against the actions in the plan and provide quantitative reports on data in tonnes of $CO_2$; and*

*Become zero carbon by 2038 at the latest (based on the Tyndall Centre for Climate Research definition of zero which is at least a 95% reduction i.e., a reduction of 35,547 tonnes $CO_2$ from the 2018/19 total which would mean that the Council's direct emissions in 2037/38 would be less than 1,871 tonnes $CO_2$).'*

7.34. The plan states the following in relation to citywide emissions:

*'The Council also recognises the importance of supporting and influencing our residents and organisations to take action to reduce their direct and indirect $CO_2$ emissions and to adapt to the changing climate.'*

### Manchester Climate Change Framework 2020 – 2025

7.35. Produced by the Manchester Climate Change Partnership, the Manchester Climate Change Framework 2020-2025 is the city's high-level strategy for tackling climate change. It sets out how Manchester will 'play its full part in limiting the impacts of climate change'.

7.36. The objectives and targets include:

- *'Staying within our carbon budgets – based on recommendations by the Tyndall Centre for Climate change Research in 2020;*
- *Climate adaptation and resilience; and*
- *Inclusive, zero carbon and climate resilient economy.'*

7.37. Areas for action to meet the objectives and targets include:

- *'Buildings (existing and new);*
- *Renewable energy; and*
- *Green infrastructure and nature-based solutions'*

## Guidance Documents

### IEMA EIA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition (IEMA, 2022)

7.38. This guidance is a revision of the 2017 institute of Environmental Management and Assessment (IEMA) guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance. It complements IEMA's latest guidance on Climate Change Resilience and Adaptation (2020) and builds on the Climate Change Mitigation and EIA overarching principles. This guidance states that:

- *'GHG emissions should be assessed and reported as part of a good practice approach to EIA.'*

7.39. The guidance provides the following justification for scoping in a GHG emissions assessment:

- *'The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect;*
- *The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. biodiversity, water, land use, air quality); and*
- *GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant.'*

7.40. One of the major updates in this guidance is that mitigation has taken a much more prominent role within the EIA. It is no longer an element to be considered towards the later stages of the EIA process but should be considered from the outset and throughout the project's lifetime.

### BE EN 15978 Sustainability of Construction Works – Assessment of Environmental Performance and Buildings – Calculation Method (BSI, 2011)

7.41. The purpose of this Standard is to provide a consistent framework for the assessment of life cycle GHG emissions associated with new and existing buildings. This follows a modular approach, breaking down the lifecycle of the Proposed Development into the product stage, the construction stage, the in-use stage, the end-of-life stage and elements beyond the building lifecycle.

### Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment (RICS, 2017)

7.42. This guidance aims to harmonise whole life carbon assessment by providing consistency in the interpretation and implementation of the methodology in BS EN 15978 to achieve coherent and comparable results that can be used to benchmark whole life cycle carbon performance of built assets.

### UK Green Building Council (UKGBC) Embodied Carbon: Developing a Carbon Brief (UKGBC, 2017)

7.43. This guidance helps designers identify basic cost-effective actions to reduce the carbon impact of the materials used in construction projects.

### Waste and Resources Action Programme (WRAP) Cutting Embodied Carbon in Construction Projects (WRAP, 2011a)

7.44. This guidance helps designers identify basic cost-effective actions to reduce the carbon impact of the materials used in construction projects.

### WRAP Procurement Requirements for Carbon Efficiency (WRAP, 2011b)

7.45. This guidance is for low-carbon building projects and estates management; to set requirements for 'carbon efficiency' (or low-carbon buildings) when procuring design, construction, refurbishment, and facilities management services for existing and new buildings.

### Greater London Authority (GLA) Construction Scope 3 (Embodied) Guidance on Greenhouse Gas Accounting and Reporting (GLA, 2013)

7.46. Although the Proposed Development is not in London, this guidance provides information on best practice. This accounting and reporting guidance written for the GLA contains a series of recommendations which aim to improve the understanding and consistency of the accounting and reporting of embodied emissions within the construction sector from cradle-to-grave. This document provides guidance on how to carry out calculations to measure the embodies carbon impact of buildings.

### Mayor or London Whole Life-Cycle Carbon Assessment Guidance (GLA, 2020)

7.47. Although the Proposed Development is not in London, the guidance provides information on best practice. London Plan Policy SI 2 sets out a requirement for developments to calculate and reduce whole life carbon emissions. Guidance has been published to explain how the assessment of these carbon emissions should be approached and presented.

### London Energy Transformation Initiative (LETI) Embodied Carbon Primer (LETI, 2020)

7.48. Although the Proposed Development is not in London, the guidance provides information on best practice. The LETI Embodied Carbon Primer offers guidance to those interested in exploring embodied carbon in more detail. There is a lack of knowledge in the built environment industry surrounding embodied carbon reduction strategies and calculations. Therefore, LETI has produced the primer to support project teams to design buildings deliver ambitious embodied carbon reduction.

## Assessment Methodology and Significance Criteria

7.49. The following section outlines the methodologies applied to identify and assess the potential impacts and likely effects associated with the Proposed Development.

## Scope of the Assessment

7.50. The following potential effects were scoped into the assessment:

- Whole life embodied carbon relating to construction (product, installation, in-use maintenance, repair, replacement and refurbishment, and end-of-life) over a 60-year study period;
- Operational energy carbon relating to the total predicted energy use (regulated and unregulated) over a 60-year study period; and
- Operational annual water demand.

## Method of Baseline Collection

7.51. The baseline consists of the GHG emissions associated with the current site use. The baseline (Scenario 1) GHG emissions have then been compared to the GHG emissions associated with the Proposed Development (Scenario 2). The Site is currently used as a stadium, estimated annual GHG emissions have been taken from the Manchester City Game Plan: Sustainability Report 2022.

7.52. The baseline scenario assessed covers a 60-year period to provide a point at which to compare the GHG emissions associated with the Proposed Development to, thereby determining the change in GHG emissions associated with the Site compared to the existing Site (baseline). This is in line with the IEMA (2022) guidance. For the purpose of comparison, in the future baseline scenario, it is assumed that the Site will remain unaltered for the equivalent time of the lifecycle of the Proposed Development (i.e., 60 years after the baseline year).

## Method of Assessment

7.53. There is currently no standard methodology for quantifying GHG emissions within the EIA process. The IEMA Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition (2022) instead advocates for flexibility and proportionality to suit the development under assessment.

7.54. For the purposes of the assessment, the Proposed Development has been split up into lifecycle stages, as per BS EN 15978: 2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method, as shown in Error! Reference source not found..

7.55. The decision to include or exclude a source of GHG emissions is based on:

- The relative contribution of a GHG emissions source to the total emissions over the whole life of the Proposed Development;
- The availability of published benchmarks and certainty over future technologies and scenarios to meaningfully estimate the GHG emissions; and
- The opportunities for design and construction decisions to significantly influence the reduction of a GHG emissions source.

7.56. GHG emissions caused by an activity are often categorised into ‘scope 1’, ‘scope 2’ or ‘scope 3’, following the guidance of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) Greenhouse Gas Protocol suite of guidance documents (WRI and WBSCD, 2014).

7.57. The ES chapter does not refer to scope 1, 2 and 3 emissions throughout, instead referring to emission by lifecycle stage. However, the following section provides an overview of which scope the assessed emissions fall within.

7.58. Scope 1 emissions include direct emissions from owned or controlled sources. With respect to the Proposed Development this may include:

- Fuel usage (including gas) and the fuel used by the club in Club owned and leased vehicles.

7.59. Scope 2 emissions include indirect emissions from purchased energy. With respect to the Proposed Development this may include:

- The consumption of electricity across the Proposed Development.

7.60. Scope 3 emissions include indirect value chain emissions, resulting from the activities of assets not controlled or owned by the Proposed Development occurring before or after they have control of an asset. With respect to the Proposed Development this may include:

- Travel of fans and others to and from match days, and the hotel.

## Construction Phase

7.61. Based on the criteria set out above and in line with **Error! Reference source not found.**, the assessment of the construction phase takes into account the following sources of GHG emissions:

- A1-A3 Product stage: GHG emissions associated with the material extraction, transportation and manufacturing of construction products. These fall within scope 3 emissions; and
- A4-A5 Construction process stage: GHG emissions associated with product delivery to Site and the installation process. These mainly fall within scope 1 and scope 2 emissions.

## Operational Phase

7.62. Based on the criteria set out above and in line with **Error! Reference source not found.**, the assessment of the operation takes into account the following sources of GHG emissions:

- B1-B5 In-use-stage: This use stage captures GHG emissions associated with the operation of the built asset over its entire lifecycle, from practical completion to the end of its service life. These fall within scope 3 emissions;
- B6 Operational energy: GHG emissions associated with the estimated total operational energy These fall within scope 2 emissions;
- B7 Operational water: GHG emissions associated with operational water consumption. This falls within scope 2 emissions; and
- C1-C4 End of Life Stage: GHG emissions associated with the demolition and disassembly of the Proposed Development, as well as the exploration of circular economy principles. These mainly fall within scope 1 emissions.

## Sources of GHG emissions excluded from the assessment

7.63. Based on the criteria set out above, the following sources of GHG emissions have been excluded from the scope of the assessment:

- GHG emissions associated with operational transport: The Framework Travel Plan will set out how physical and operational interventions will be adopted to encourage sustainable and low carbon modes of travel;
- Operational waste: GHG emissions associated with waste management are likely to make up a small proportion of the overall GHG emissions associated with the Proposed Development. An Operational Waste Management Strategy will be submitted alongside the planning application. This will set out how physical and operational interventions will be adopted that follow the waste hierarchy;
- Carbon sequestration of green infrastructure: The Site is currently occupied, and the Proposed Development will result in the removal of no vegetation. There is also minimal green infrastructure associated with the Proposed Development. Therefore, GHG emissions associated with carbon sequestration of green infrastructure will be low relative to total GHG emissions over the whole life of the Proposed Development; and
- Beyond building lifecycle: GHG emissions associated with the 'beyond building lifecycle' stage cannot be guaranteed, for example material and component re-use; therefore potential benefits will not be quantified and taken as an offset.

## Significance Criteria

7.64. The assessment of the likely effects as a result of the Proposed Development has taken into account both the construction phase and operational phase. In line with the IEMA (2022) guidance, the sensitivity of the receptor (i.e., the global atmosphere) in relation to GHG emissions is always considered to be 'high'. The criteria for determining the significance of effects are outlined in Table 7.3. The significance level attributed to each effect is based on the best practice guidance from IEMA (2022).

Table 7.3 – Criteria for determining significance of effects

| Magnitude of impact | Criteria for assessing impact |
|---|---|
| **Major** | The Proposed Development's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero. |
| **Moderate** | The Proposed Development's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero. |
| **Minor** | The Proposed Development's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero. |
| **Negligible** | The Proposed Development's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions. |
| **Beneficial** | The Proposed Development's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with major beneficial effects substantially exceeds net zero requirements with a positive climate impact. |

7.65. Effects can also be described, for example, as:

- Beneficial or adverse;
- Permanent or temporary;
- Short, medium or long term; and
- Significant (major or moderate) or insignificant (minor or negligible).

## Baseline Conditions

7.66. This section outlines the existing baseline conditions of the Site.

7.67. In line with IEMA (2022) guidance, the current baseline for the Proposed Development is defined as the current GHG emissions arising from activities within the Site boundary for the assessment year (2023).

7.68. The Site is currently occupied by the existing north stand of the Etihad Stadium. The Manchester City Game Plan 2022, Sustainability agenda update + environmental impact report, contains a record of the GHG emissions of the club for the year 2021-2022.

7.69. The total emissions for the entire stadium for the period 2021-2022 was 6506.4 $tCO_2e$. The total emissions for the existing North Stand are calculated as being 15% of those for the entire stadium, based on current seat numbers. The total emissions for the North Stand for the period 2021-2022 are estimated to be 975.96 $tCO_2e$. The baseline emissions are broken down in Table 7.4.

Table 7.4 – MCFC 2021-2022 reported emissions, (Game Plan: Sustainability Report 2022)

| Emission | Total 2021-2022 $tCO_2e$ operational | North stand 2021-2022 $tCO_2e$ operational |
|---|---|---|
| **Operations** | | |
| Match Day Operations (Etihad Stadium) | 2,447.6 | 367.14 |
| Non Match Day Operations (including commuting) | 2,422 | 363.3 |
| **Energy** | | |
| Electricity (zero carbon power purchase agreement (ppa)) | 0 | 0 |
| Gas | 1,604 | 240.6 |
| Water | 0 | 0 |
| Generator fuel | 9.8 | 1.47 |
| **Other** | | |
| Construction | 17 | 2.55 |
| Miscellaneous allowance and other operations | 6 | 0.9 |
| **Total** | **6506.4** | **975.96** |

7.70. For the purpose of comparison, for the baseline scenario and future baseline scenario, it is assumed that the Site will remain unaltered for the lifecycle of the Proposed Development (i.e., 60 years after the baseline year). Therefore, it is assumed that if the Proposed Development did not go ahead, the annual emissions of the Site (the North Stand) would continue to be 975.96 $tCO_2e$/year.

## Identification and Evaluation of Significant Effects

### Sensitive receptors

7.71. The global atmosphere is the primary sensitive receptor which will be considered in the following assessment.

7.72. GHG emissions arising from the construction and operation of the Proposed Development are considered the key impacts, with the principal receptor being atmospheric GHG concentrations. The consequence of GHG emissions associated with the Proposed Development is that atmospheric GHG emissions are pushed closer towards their environmental limit, triggering subsequent effects on the global climate system.

7.73. Sensitivity is defined by taking into consideration the value, vulnerability and reversibility of the receptor. With regard to global atmospheric GHG concentrations, sensitivity is considered 'high' based on the following conclusions:

- Value of the resource: the atmosphere and its role in regulating the global climate is of high ecological social and economic value and underpins life on the planet; therefore, is of global critical value;
- Vulnerability: it is recognised by the Paris Agreement (2015) that the GHG concentrations in the atmosphere are already approaching their environmental limit and the effects of climate change are already evident; and
- Reversibility of the effect: climate change is considered irreversible, with a delayed effect in any actions or technologies employed to reduce concentrations of GHG emissions already in the atmosphere.

## Assessment of effects, mitigation and residual effects

### Construction phase

7.74. This section identifies and assesses the scale and nature of the effects arising from the Proposed Development during the construction phase.

Relevant aspects of the Proposed Development

7.75. The following embedded mitigation measures, set out in the Sustainability Statement, are being committed to by the applicant to reduce GHG emissions associated with the construction phase of the Proposed Development:

- Reduced embodied carbon – Circular economy principles to reduce impact of construction materials, measured through a whole life carbon assessment; and
- Re-use of materials – Assessment of reuse of crushed aggregate where applicable in construction activities.

### Embodied carbon associated with the product stage (lifecycle stages A1-A3) and the construction stage process stage (lifecycle stages A4-A5)

7.76. As part of the Sustainability Statement, a Carbon Life Cycle Assessment has been carried out for the Proposed Development. Based on this, GHG emissions associated with lifecycle stages A1-A3 will be approximately 27,000 $tCO_2e$. GHG emissions for the lifecycle stages A4-A5 will be approximately 4,200 $tCO_2e$. Therefore, the total construction phase embodied carbon will be approximately 31,200 $tCO_2e$. Table 7.5 summarises the results of The Carbon Life Cycle Assessment for lifecycle stages A1-A3 and A4-A5.

Table 7.5 – Embodied carbon associated with the product stage and construction stage for the Proposed Development

| | Lifecycle stage emissions $tCO_2e$ | |
|---|---|---|
| | Product (A1-A3) | Construction (A4-A5) |

| | | |
|---|---|---|
| North Stand | 16,928.4 | 2,640.5 |
| Commercial | 3,373.3 | 595.4 |
| Hotel | 9,435.2 | 1,632.6 |
| Total | **29,736.9** | **4,868.5** |

7.77. The significance of effects of embodied carbon associated with the product and construction stages of the Proposed Development are of major adverse significance.

### Operational Phase

7.78. This section identifies and assesses the scale and nature of the effects arising from the Proposed Development during the operational phase.

Relevant aspects of the Proposed Development

7.79. The following embedded mitigation measures, set out in the Sustainability Statement, are being committed to by the applicant to reduce GHG emissions associated with the operational phase of the Proposed Development:

- Zero-Carbon 2038 – Committed route map to be net zero in operational carbon;
- Efficient Building Services Systems – CO2 emissions reduction against Building Regulations Part L 2021 through intelligent energy-efficient building service systems: 29% in North Stand, 13.7% in Hotel and 37.2% in commercial;
- Renewable technologies – PV area maximised on the roof: 500m2 on North Stand, 800m2 for commercial building and 100m2 for Hotel with use of monocrystalline panels;
- Low Carbon Technologies – Air Source Heat Pumps for heating and cooling, Mechanical Ventilation with Heat Recovery (MVHR) throughout point of use, domestic water heaters (DWH) in commercial building;
- High-Efficiency Envelope – U-values better than minimum requirement of Part L 2021 (over 50% for roof, walls and floor); and
- Water Efficiency – Over 40% less water use than a comparable building through water-efficient sanitaryware and catering specifications.

7.80. The Manchester City Sustainability Game Plan 2022 is the annual review of the club's ongoing sustainability work, and details its targets, achievements and progress made over the last 12 months.

7.81. The Game Plan includes the following commitments made by the club. It is assumed that they will be applicable to the operational phase of the Proposed Development.

- Electricity is purchased only from certified renewables, this falls into the 'be green' rung of the energy hierarchy, behind 'be lean' (use less energy) and 'be clean' (local energy sources);
- The Club will not build any new facilities to include gas supply; and
- The Club is working to reduce potable water consumption by up to 50% by 2025.

Operational embodied carbon (lifecycle stage B1-B5)

7.82. Embodied carbon associated with the operation stage (i.e., lifecycle stage B1-B5) has been estimated by applying appropriate embodied carbon benchmarks based on floor area and building typologies. A summary of the assumptions that have been made when calculating estimated GHG emissions can be

found in Appendix 7-1. Embodied carbon associated with the in use (maintenance) stage has been estimated to be approximately 69,200 $tCO_2e$ over the 60-year lifecycle of the Proposed Development.

7.83. As there is no commitment in place to reduce lifecycle embodied carbon, the effects of operational embodied carbon associated with the Proposed Development are of major adverse significance.

Operational energy consumption (lifecycle stage B6)

7.84. Energy use intensity per square metre of floor area has been applied to the estimated floor area of the Proposed Development. Electricity consumption intensity is based on values within the Energy Strategy. As a worst-case scenario, electricity consumption intensity values for Part L, without the application of the energy hierarchy be-lean, be-clean, be-green, have been used. A summary of the electricity consumption intensity values used when calculating estimated GHG emissions figures can be found in Appendix 7-1.

7.85. The Department for Business, Energy and Industrial Strategy (BEIS) Greenhouse Gas Reporting: Conversion Factors 2022 for grid electricity have then been applied to provide an estimate of annual operational energy GHG emissions associated with the Proposed Development. A summary of the assumptions that have been made when calculating estimated GHG emissions figures can be found in Appendix 7-1.

7.86. **Error! Reference source not found.** shows the estimated annual GHG emissions for operational energy associated with the Proposed Development for a 60-year period from the end of the construction period. Relevant BEIS carbon factors have been applied for each year over the 60-year study period. This shows that GHG emissions associated with the Proposed Development are likely to increase as the Proposed Development is built out and reduce once operational.

7.87. Annual GHG emissions associated with operational energy peak at between 650 and 840 tCO2e/y in 2025 as the Proposed Development is built out. Annual GHG emissions associated with operational energy are then predicted to reduce to between 8 and 14 $tCO_2e/y$ for the lifecycle of the development beyond 2050. Beyond 2050, the annual GHG emissions associated with operational energy remain constant based on BEIS carbon factors, but in reality are likely to reduce further as the electricity grid fully decarbonises. A range of values (i.e., low, medium and high) have been provided to allow for variations in energy consumption for building typologies, taking into account factors such as building location, building orientation and building materials used.

7.88. **Error! Reference source not found.** shows the cumulative GHG emissions associated with operational energy over the 60-year lifecycle of the Proposed Development. It is predicted that cumulative emissions associated with operational energy will be between 3,400 and 6,100 $tCO_2e$ over the 60-year lifecycle of the Proposed Development.

7.89. The Club has a commitment in place to achieve net zero emissions associated with operational energy by 2030. As this is compatible with the budgeted, science based 1.5°C trajectory and is in line with the UK's trajectory towards net zero by 2050, the effects are of minor adverse significance.

Operational water (lifecycle B7)

7.90. Estimated water consumption for the North Stand has been based on the Building Services Research and Information Association (BSRIA) Rules of Thumb Guidance for Building Services (BSRIA, 2011), which is estimated to be 0.007 cubic metres per day per person. The number of occupants on the Site as a whole was based on the number of additional seats provided by the Proposed Development. Based on this, water consumption over the 60-year design life for the Proposed Development will be approximately 1,213,830 cubic metres. A summary of the assumptions that have been made and benchmarks used when calculating estimated GHG emissions can be found in Appendix 7-1.

7.91. Estimated water consumption for the commercial building has been based on the Building Services Research and Information Association (BSRIA) Rules of Thumb Guidance for Building Services (BSRIA, 2011). The Non-domestic Buildings Technical Manual was used to estimate the occupant density for each use of the building. Based on this, water consumption over the 60-year design life will be approximately 500,610 cubic metres. A summary of the assumptions that have been made and benchmarks used when calculating estimated GHG emissions can be found in Appendix 7-1.

7.92. Estimated water consumption for the hotel has been based on the Building Services Research and Information Association (BSRIA) Rules of Thumb Guidance for Building Services (BSRIA, 2011). The Non-domestic Buildings Technical Manual was used to estimate the occupant density for each use of the building. Based on this, water consumption over the 60-year design life will be approximately 3,145,370 cubic metres. A summary of the assumptions that have been made and benchmarks used when calculating estimated GHG emissions can be found in Appendix 7-1.

7.93. The BEIS Greenhouse Gas Reporting: Conversion Factors 2022 states that the carbon factor for water supply in the UK is 0.149 kg $CO_2e$ per $m^3$ of water supplied. Based on this, GHG emissions attributed to water demand for the Proposed Development over the 60-year lifecycle are summarised in Table 7.6.

Table 7.6 – Summary of GHG emissions associated with water consumption for the 60-year design life of the Proposed Development

| Building | Water consumption over 60-year lifecycle ($m^3$) | Carbon factor (kg $CO_2e$ per $m^3$ of water supplied) | GHG emissions ($tCO_2e$) |
|---|---|---|---|
| North Stand | 1,213,830 | 0.149 | 180 |
| Commercial Building | 500,610 | 0.149 | 75 |
| Hotel | 3,145,370 | 0.149 | 470 |
| **Total** | **4,859,810** | **N/A** | **725** |

7.94. As there are commitments in place to reduce operational water consumption by up to 50% by 2025, the effects associated with operational water consumption are of moderate adverse significance.

End-of-life stage (lifecycle C1-C4)

7.95. As part of the Sustainability Statement, a Carbon Life Cycle Assessment has been carried out for the Proposed Development. Based on this, GHG emissions for the lifecycle stages C1-C4 will be approximately 1,500 $tCO_2e$. Table 7.7 summarises the results of The Carbon Life Cycle Assessment for the end-of-life stage (lifecycle C1-C4).

Table 7.7 – Embodied carbon associated with the end-of-life stage of the Proposed Development

| | End of Life emissions $tCO_2e/m^2$ (C1-C4) |
|---|---|
| **North Stand** | 621.1 |
| **Commercial** | 52.6 |
| **Hotel** | 855.1 |

| | |
|---|---|
| Total | 1,528.9 |

7.96. The effects associated with the end-of-life stage are of major adverse significance.

Wider context GHG emissions

7.97. According to 2005 to 2020 UK local regional greenhouse gas emissions data provided by the Department for Business, Energy and Industrial Strategy (BEIS) , emissions associated with Manchester for 2020 (the most recent available dataset) were 2,186 kt $CO_2e$. In order to gain a sense of scale of the GHG emissions associated with the Proposed Development, it may be noted that the Proposed Development represents approximately 0.034% of Manchester's emissions at the peak of operational emissions in 2027, and approximately 0.00064% during operation post 2050. However, direct comparisons should not be made between these figures because the BEIS GHG emissions figures do not consider 'consumption-based' emissions (i.e. embodied carbon), while the GHG emissions figures for the Proposed Development do. It is likely that a significant proportion of construction materials will be imported; therefore, it is not a like-for-like comparison. Additionally, due to the global nature of GHG emissions, this point of comparison has not been used to determine significance of effects.

## 2014 Extant Consent

7.98. An assessment of the 2014 consented north stand scheme has been scoped out of the GHG assessment. An assessment of this scenario is not relevant as all climate change effects are likely to be the same for both the 2014 consented north stand scheme and the Proposed Development, during both construction and operation.

## Mitigation Measures

### Construction

7.99. Table 7.8 provides a summary of the supplementary mitigation measures relating to construction GHG emissions associated with the Proposed Development.

Table 7.8 – Summary of construction supplementary mitigation measures

| Adverse effect | Mitigation measure | Responsibility/mechanism for implementation | Timing |
|---|---|---|---|
| Construction stage GHG emissions | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business as usual baseline. The business as usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Developer/contractor | Prior to construction |
| | Explore the possibility of using cement replacement where possible to reduce embodied carbon. | Developer/contractor | Prior to construction |

| Adverse effect | Mitigation measure | Responsibility/mechanism for implementation | Timing |
|---|---|---|---|
| | Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.) | Developer/Contractor | As soon as possible |
| | Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials. | Developer/contractor | Prior to construction |
| | Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.) | Developer/contractor | As soon as possible. |
| | Review opportunities to reduce the number and distance of construction transport trips. | Developer/contractor | As soon as possible. |
| | Review opportunities to reduce energy association with construction installation processes. | Developer/contractor | Prior to construction |
| | Review opportunities for modular off-site construction techniques, to consolidate delivery requirements, for energy efficient assembly and minimising site installation process. | Developer/contractor | Prior to construction |
| | Maximise recycled content in the steelwork. | Developer/contractor | As soon as possible |
| | Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds/covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead. | Architect and Structural Engineer | Detailed Design stage |
| | Implement a travel plan for site staff. | Contractor<br><br>To be included as part of the Construction Management Plan | Site enabling works |
| | Temporary electrical supply connection to minimise the use of on-site diesel generators. | Contractor<br><br>To be included as part of the Construction Management Plan. | Site enabling works |
| | Site energy monitoring and improvement programme. | Contractor | Site enabling works |

| Adverse effect | Mitigation measure | Responsibility/mechanism for implementation | Timing |
|---|---|---|---|
| | Using less or alternative material and design to maximise useful lifetime. Embodied carbon impact to be assessed and reviewed post-planning during the design development to ensure that the carbon impact is further reduced where feasible. | To be completed by the Sustainability Engineers with input from facade, structures, architects and MEP. | RIBA stage 3-4 |

## Operation

7.100. Table 7.9 provides a summary of the supplementary mitigation measures relating to operational GHG emissions associated with the Proposed Development.

Table 7.9 – Summary of operational supplementary mitigation measures

| Adverse effect | Mitigation measure | Responsibility/mechanism for implementation | Timing |
|---|---|---|---|
| In use stage (B1-B5) and end of life stage (C1-C4) | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the Proposed Development, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Developer/contractor | Prior to construction |
| In use stage (B1-B5) | Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan). | Developer/ contractor | As soon as possible. |
| In use stage (B1-B5) | Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings). | Developer/ contractor | As soon as possible. |
| Operational energy (B6) | Explore the use of passive design measures in order to reduce the need for heating | Developer/contractor | Prior to construction |
| Operational energy (B6) | Where any electrical equipment is being installed, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment. | Developer/contractor | Prior to construction |
| Operational water (B7) | Specify the use of water meters to measure water consumption. | Developer/contractor | Prior to construction |

## Cumulative Effects

7.101. Unlike other environmental effects discussed in the ES that have a direct or indirect effect on the Site and local area, effects from GHG emissions are not localised but contribute to the global atmospheric concentration of greenhouse gasses and consequently contribute to the global climate change effect. Therefore, assessing emissions from the Proposed Development in terms of combined effects with other nearby developments is extraneous and immaterial in terms of localised effects. The Proposed Development should be viewed, rather, in the context of developments and construction projects globally as it contributes to a global climatic effect. As there are GHG emissions associated with almost all new developments globally and that we are approaching a global climate tipping point, it may be stated that cumulative effects are significant.

## Residual Effects

Table 7.10 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| **The global atmosphere** | Major adverse | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business as usual baseline. The business as usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the Proposed Development, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Moderate adverse. Effects are long term. |
| | | Explore the possibility of using cement replacement where possible to reduce embodied carbon. | |
| | | Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.) | |
| | | Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials. | |
| | | Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.) | |
| | | Review opportunities to reduce the number and distance of construction transport trips. | |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | | Review opportunities to reduce energy association with construction installation processes. | |
| | | Review opportunities for modular off-site construction techniques, to consolidate delivery requirements, for energy efficient assembly and minimising site installation process. | |
| | | Maximise recycled content in the steelwork. | |
| | | Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds / covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead. | |
| | | Implement a travel plan for site staff. | |
| | | Temporary electrical supply connection to minimise the use of on-site diesel generators. | |
| | | Site energy monitoring and improvement programme. | |
| | | Using less or alternative material and design to maximise useful lifetime. Embodied carbon impact to be assessed and reviewed post-planning during the design development to ensure that the carbon impact is further reduced where feasible. | |
| Operational | | | |
| **The global atmosphere.**<br>**Embodied carbon associated with the in-use stage for the Proposed Development (lifecycle stage B1-B5)** | Major adverse | Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan). | Moderate adverse. Effects are long term. |
| | | Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings). | |
| **The global atmosphere.** | Minor adverse | Explore the use of passive design measures in order to reduce the need for heating | Minor adverse. Effects are long term. |

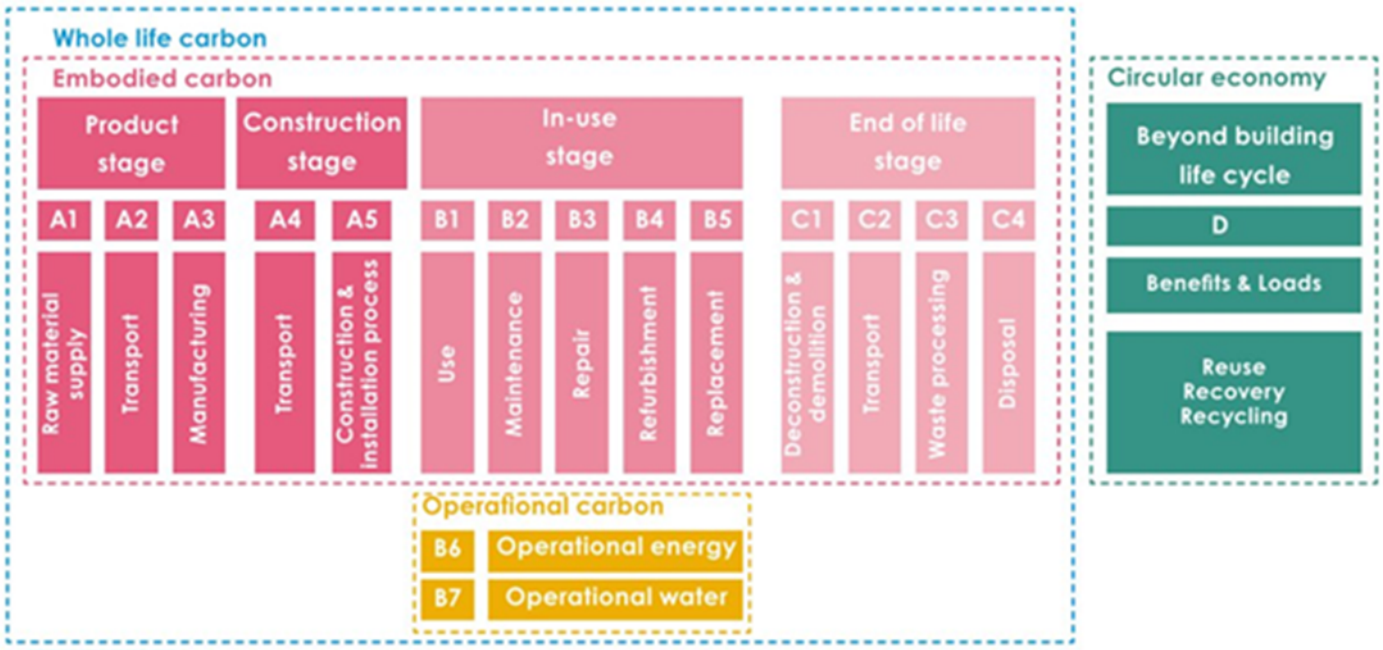
| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| GHG emissions associated with operational energy for the Proposed Development (lifecycle stage B6) | | Where any electrical equipment is being installed, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment. | |
| The global atmosphere.<br>GHG emissions associated with operational water consumption (lifecycle stage B7) | Moderate adverse | Specify the use of water meters to measure water consumption. | Moderate adverse. Effects are long term. |
| The global atmosphere.<br>GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4). | Major adverse | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the Proposed Development, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Moderate adverse. Effects are long term. |

## Reference List

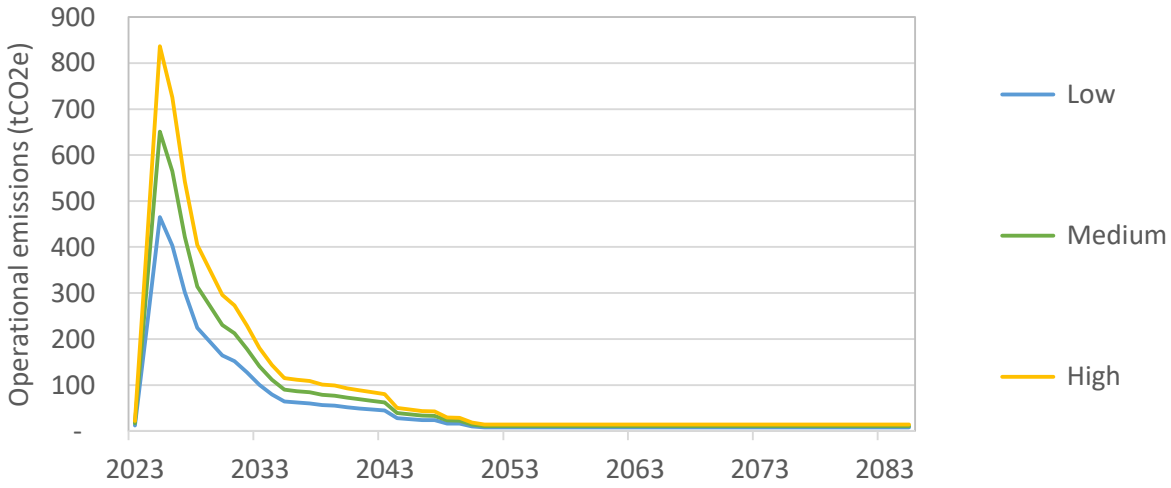
7.102. This ES Chapter has been prepared by reference to the following:


- British Standards Institution (BSI) (2011) BS EN 15978:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method;
- Department for Business, Energy & Industrial Strategy (2022). UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2020. Available at: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020;
- Greater London Authority (GLA) (2013). Construction Scope 3 (Embodied) Guidance on Greenhouse Gas Accounting and Reporting;
- Greater Manchester Combined Authority (GCMA) (2021) Places for Everyone, Joint Development Plan – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan. Publication Stage;
- Institute of Environmental Management and Assessment (IEMA) (2022) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition;
- London Energy Transformation Initiative (LETI). (2020) Embodied Carbon Primer;
- Manchester City (2022) Game Plan 2022. Sustainability agenda update + environmental impact report;
- Manchester City Council. (2012). Manchester Core Strategy (2012-2027);
- Manchester City Council. (2020). Manchester City Council Climate Change Action Plan 2020-2025;

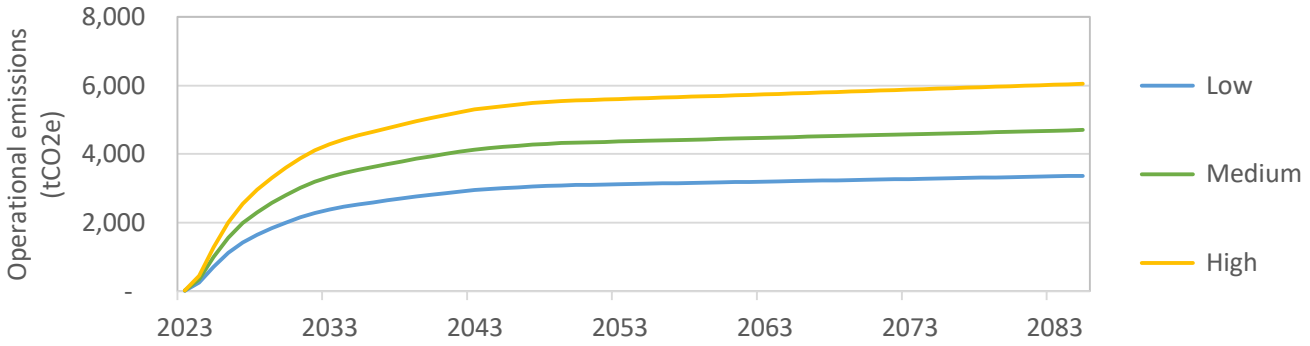
- Manchester Climate Change Partnership and Manchester Climate Change Agency. (2020). Manchester Climate Change Framework 2020-2025;
- Mayor of London (2020). Whole Life-Cycle Carbon Assessment Guidance;
- Ministry of Housing, Communities & Local Government (MHCLG). (2019). National Planning Policy Framework (NPPF);
- Ministry of Housing, Communities & Local Government (MHCLG). (2017). National Planning Practice Guidance (NPPG);
- Royal Institution of Chartered Surveyors (RICS). (2017). Whole Life Carbon Assessment for the Built Environment;
- The Building Regulations 2010 and 2013, 2016, 2021 (as amended);
- The Stationary Office. (2017). Town and Country Planning (EIA) Regulations 2017 (as amended, 2018);
- UK Climate Change Act 2008 (2050 Target Amendment) (Order 2019);
- UK Green Building Council (UKGBC). (2017). Embodied Carbon: Developing a Client Brief;
- Waste and Resource Action Programme (WRAP). (2011a) Cutting Embodied Carbon in Construction Projects; and
- Waste and Resource Action Programme (WRAP). (2011b). Procurement Requirements for Carbon Efficiency.




| | | | | |
|---|---|---|---|---|
| | **Figure:** | **7.1** | | |
| | **Title:** | **Diagram showing the stages of a lifecycle GHG emissions assessment. Diagram taken from LETI (2020) Embodied Carbon Primer, based on lifecycle stages set out in BS EN 1597:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method.** | | |
| | **Project:** | **Project North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **NTS** |




| | | | | |
|---|---|---|---|---|
| | **Figure:** | **7.2** | | |
| | **Title:** | **Annual GHG emissions associated with operational energy over the 60-year design life of the Proposed Development** | | |
| | **Project:** | **Project North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **NTS** |




| | | | | |
|---|---|---|---|---|
| | **Figure:** | **7.3** | | |
| | **Title:** | **Cumulative operational energy GHG emissions over the 60-year design life of the Proposed Development** | | |
| | **Project:** | **Project North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **NTS** |

# 8. Flood Risk and Drainage

## Introduction

8.1. This Chapter of the ES has been prepared by Buro Happold and assesses the likely water resources and flood risk impacts of proposals upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

8.2. This Chapter is accompanied by two technical appendices, a Flood Risk Assessment (Appendix 8.1) and a Drainage Strategy (Appendix 8.2).

8.3. The Flood Risk Assessment (FRA) has been prepared in accordance with the National Planning Policy Framework (NPPF) (2021), the Manchester Core Strategy (2012) and the Manchester City, Salford City, and Trafford Council's Strategic Flood Risk Assessment (SFRA).

| | | | |
|---|---|---|---|
| | Lead Author | Reviewer | Final Reviewer |
| Name | Courtney Cooper | Tom Peacock | Mark Crowther |
| Company | Buro Happold | Buro Happold | Buro Happold |
| Qualifications/Accreditations relevant to technical area | MA (Hons) Architecture<br><br>MSc Environmental Management | BSc Geography<br><br>MSc Sustainability and Consultancy | BSc Environmental Geology<br><br>MSc Catchment Dynamics and Management (hydrology)<br><br>CEnv MIEMA |
| Does the practitioner hold any IEMA qualification? | Graduate IEMA Membership | Practitioner IEMA Membership | Full member of IEMA |
| Company hold IEMA QMark? | No | | |
| Years technical experience (in technical area) | 1 | 4 | 12 |
| Number of EIA's delivered to date | 2 water resource and flood risk ES Chapters. | 4 water resource and flood risk ES Chapters. Project management of 3 EIAs. | More than 50 water resource and flood risk ES Chapters. |

## Limitations and Assumptions

8.4. The water environment is well understood for the purpose of this assessment. The understanding of the water environment has been informed through several best practice modelling techniques, to produce

the best accurately available baseline scenario. This assessment is reinforced by sound judgement and professional experience gained from working on similar projects.

## Legislative and Policy Context

8.5. A range of guidance and legislation inform the requirements for water resource management. This includes environmental policy on protecting and improving water quality, guidance on flood mitigation, and regulations on potable water and foul water management.

### National Legislation

#### The Water Resources Act (1991)

8.6. This is an Act of Parliament that regulates water resources, water quality and pollution, and flood defence. Additionally, this Act sets out the functions of the Environment Agency (EA).

#### The Water Resources Act (Amendment) (England and Wales) Regulations (2009)

8.7. These Regulations provided amendments to the Water Resources Act 1991 by making some changes to the powers to designate Water Protection Zones and the powers to carry out anti-pollution works and service notices regarding such works.

#### The Water Act (2014)

8.8. This Act deregulated the water industry, enabling greater competition for non-household customers. Additionally, this Act gave Ofwat new powers to make rules about charges and charges schemes, as well as making provisions for flood insurance and drainage boards.

#### The Environment Act (1995)

8.9. This Act created a number of new agencies and set new standards for environmental management. The Act set up the following agencies:

- The EA;
- The Scottish Environmental Protection Agency; and
- The National Parks Authority.

#### The Environmental Protection Act (1990)

8.10. This Act defines the fundamental structure and authority for waste management and control of emissions into the environment. The Act is split into the following parts:

- Part I: establishes a regime by which the Secretary of State can prescribe any process or substance and set limits on it respective of its emissions into the environment
- Part II: sets out a regime for regulating and licensing the acceptable disposal of controlled waste on land
- Part III: defines a class of statutory nuisances over which the local authority can demand remedial action supported by criminal penalties
- Part IV: defines a set of criminal offences concerning litter
- Part VI: defines a regime of statutory notification and risk assessment for genetically modified organisms (GMOs)
- Part VII: created three new organisations: the Nature Conservancy Council for England, the Nature Conservancy Council for Scotland, and the Countryside Council for Wales

#### Flood and Water Management Act (2010)

8.11. This Act encourages the use of sustainable urban drainage systems (SuDS), amended the Water Industry Act to modernise the list of activities that can be restricted by water companies during a drought, and made it easier for water companies to offer lower tariffs to certain groups.

### The Anti-Pollution Works Regulations (1999)

8.12. These regulations supplement the anti-pollution works notice provisions contained in the Water Resources Act 1991. Under these Regulations, the EA can serve a notice requiring remedial action to be taken where there is actual or potential pollution affecting controlled waters.

### The Water Supply (Water Quality) Regulations (2018)

8.13. These Regulations consolidate legislation concerning the quality of water supplied for human consumption in England.

### The Control of Pollution (Oil Storage) (England) Regulations (2001)

8.14. These Regulations set minimum design standards for all new and existing above ground oil storage facilities. The key requirement is the provision of secondary containment (i.e., a 'bund' or 'drip tray') to ensure that any leaking or spilt oil cannot enter controlled waters.

### The Water Resources (Environmental Impact Assessment (EIA)) (England and Wales) Regulations (2003)

8.15. These Regulations complete the implementation, in relation to water management projects for agriculture in England and Wales on the assessment of the effects of certain public and private projects on the environment.

### The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations (2017)

8.16. These Regulations consolidate, revoke, and replace the Water Environment (WFD) (England and Wales) regulations in 2003. These Regulations represent the transposition of the European Union WFD (2014/101/EU) into UK law.

8.17. These regulations set out requirements to prevent the deterioration of aquatic ecosystems. It aims to protect, enhance, and restore water bodies to 'good' status which should have been achieved by 2015. This time limit may be extended by a maximum of two River Basin Management Cycles in certain circumstances, therefore moving the deadline to 2027.

### The Environmental Damage (Prevention and Remediation) (England) Regulations (2015)

8.18. These Regulations oblige those who create environmental damage, to not only cease the damage, but also to implement a wide variety of remedial measures to restore affected areas. Environmental damage may be via water pollution, adversely affecting protected species or sites of specific scientific interest (SSSIs), or by land pollution that causes risks to human health.

### The Environmental Permitting (England and Wales) (Amendment (No.2) Regulations (2016)

8.19. These Regulations consolidate and replace the Environmental Permitting (England and Wales) Regulations 2010.

8.20. The Regulations maintain the environmental permitting and compliance regime applying to various activities and industries. A key component is that it allows applicants that would otherwise require several permits for activities falling under various regulations on a single site to complete a single application, and to be issued with one permit. The framework introduces different levels on control, based on risk:

- Exclusion (activities that may be undertaken without any permit);
- Exemptions (activities that may be undertaken after registering, which is free);

- Standard rules permit (standard requirements and conditions for the relevant activities are set out so that applicants can determine in advance whether the permit is applicable to their proposals); and
- Bespoke permits (permits written specifically for activities which are unique or of higher risk).

### Water for Life (White Paper) (2011)

8.21. The Water for Life Report describes a vision for future water management in which the water sector is resilient, in which water companies are more efficient and customer focused, and in which water is valued as the previous and finite resource it is.

## National Planning Policy

### National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities (DLUHC), 2021)

8.22. The NPPF sets out the Government's planning policies for England and how these should be applied. It provides a framework in which locally prepared plans for development can be produced. Within the NPPF, the chapter which is the most relevant to this water chapter is section 14, which is titled 'Meeting the challenge of climate change, flooding and coastal change.

8.23. Within section 14, the NPPF defines flood risk and aims to avoid development in areas most vulnerable to flooding. This is attained through the implementation of a Sequential Test, which directs development towards areas with lowest flood risk. Where this is not possible, the NPPF requires that all new developments in flood risk areas are appropriately flood resilient and resistant, include safe access and egress routes where required and that residual risks of flooding are adequately managed.

### Planning Practice Guidance – Water Supply, Wastewater and Water Quality (DLUHC, 2021)

8.24. Planning Practice Guidance provides supplementary, more in depth, information alongside the NPPF. This guidance focuses on how to take account of and address the risks associated with flooding in the planning process.

8.25. This guidance provides a wide range of information surrounding flood risk in the planning system, including information on flood zoning, site-specific flood risk assessment, the Sequential Test and the Exception Test.

### Future Water (2008)

8.26. This document provides a water strategy for England, setting out the Government's vision for water policy and management. By 2030 at the latest, the ambition is to:

- Improve the quality of our water environment and the ecology which it supports, and continue to provide high levels of drinking water quality from our taps;
- Sustainably manage risks from flooding, with greater understanding and more effective management of surface water;
- Ensure a sustainable use of water resources, and have implemented fair, affordable, and cost reflective water charges;
- Cut greenhouse gas emissions; and
- Embed continuous adaptation to climate change and other pressures across water.

8.27. This document includes chapters on water demand, water supply, water quality in the natural environment and surface water drainage.

## Sub-Regional Planning Policy

### Emerging - Places for Everyone Plan (2021)

8.28. Places for Everyone is a long-term plan of the nine Greater Manchester districts. The plan determines the kind of development that will take place across the city-region, maximising the use of brownfield land and urban spaces while protecting green belt land from the risk of unplanned development and selectivity releasing some sites for housing and employment in key locations.

8.29. This plan is not yet adopted and is currently going through consultation. The final stage of public consultation took place from 9 August to 3 October 2021.

8.30. The plan has been prepared by Greater Manchester Combined Authority (GMCA) and includes Policy JP-S5 'Flood Risk and the Water Environment', which states the following:

*'An integrated catchment-based approach will be taken to protect the quantity and quality of water bodies and managing flood risk, by:*

- *Returning rivers to a more natural state, where practicable, in line with the North West River Basin Management Plan;*
- *Working with natural processes and adopting a natural flood management approach to slow the speed of water drainage and intercept water pollutants;*
- *Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;*
- *Expecting developments to manage surface water runoff through sustainable drainage systems and as close to source as possible (unless demonstrably inappropriate) so as to not exceed greenfield run-off rates or alternative rates specified in district local plans, such as those identified for areas with critical drainage issues.*
- *Ensuring that sustainable drainage systems:*
    - *Are designed to provide multifunctional benefits wherever possible, including for water quality, nature conservation and recreation;*
    - *Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;*
    - *Are delivered in a holistic and integrated manner, including on larger sites split into different phases; and*
    - *Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development.*
- *Securing the remediation of contaminated land and the careful design of developments to minimise the potential for urban diffuse pollution to affect the water environment;*
- *Securing further investment in wastewater treatment to reduce the frequency of intermittent discharges of storm sewage; and*
- *Conserving water and maximising water efficiency in new development.'*

### North-West River Basin District: Flood Risk Management Plan 2021-2027

8.31. In 2022, the EA published the North-West river basin district: flood risk management plan 2021 to 2027. The Flood Risk Management Plan (FRMP) sets out how risk management authorities (such as the EA, and United Utilities (UU)) will work with communities to manage flood and coastal risk from 2021-2027.

8.32. Prepared by the EA, in conjunction with wider stakeholders, the EA River Basin Management Plan provides a framework for protecting and enhancing the benefits provided by the water environment, informing planning decisions and policy making. The intention if for all water bodies to achieve 'Good' status, as defined by the European WFD. The plan is updated every six years and replaces the river basin management plan published in 2009.

8.33. The North-West river basin district covers an area of 13,160km$^2$ from Cumbria in the north to Cheshire in the south, with Lancashire, Merseyside and Greater Manchester in between. The Proposed Development is situated within the Irwell catchment area and is not within either of the two flood risk areas.

8.34. Measures in the North-West river basin district to prevent flood risk include:

*"ensuring new development is appropriate, safe and does not increase flood risk elsewhere; identifying reservoirs with a high risk of flooding; and working with local enterprise partnerships to support sustainable growth and partnerships in flood schemes."*

### Greater Manchester's SFRA (Level 1, 2010 and Level 2, 2011)

8.35. The Manchester City, Salford City, and Trafford Councils Level 1 SFRA uses mostly existing data to assess flood risk from all sources, including flooding from rivers, canals, reservoirs, groundwater, surface water and sewers.

8.36. The Level 1 SFRA states that the main source of flood risk in Manchester is from the Grey Irwell, the River Irk, Medlock and Mersey and Corn Brook. It also considers that surface water flooding is a significant risk, and that there is a residual risk from the Ashton, Rochdale and Bridgewater Canals and several reservoirs. It makes recommendations for the Level 2 SFRA including analysing the fluvial flood risk, breach of defences, and overtopping of canals, and that a detailed surface water analysis should be undertaken.

8.37. The Level 2 SFRA builds on the Level 1 SFRA and provides a more detailed understanding of flood risk across the three local authorities from all sources and outlines the residual risks of flooding after all risk avoidance, substitution, control and mitigation measures have been considered.

### UU DRAFT Drainage and Wastewater Management Plan 2023 (DWMP)

8.38. The Drainage and Wastewater Management Plan is a long-term plan, which sets out how UU propose to ensure robust and resilient drainage and wastewater services for the North West.

### North West River Basin District: River Basin Management Plan (2022)

8.39. Alongside the FRMP, the EA also published the North-West river basin district: River Basin Management Plan (RBMP) in 2016. The purpose of the RBMP is to provide a framework for protecting and enhancing the benefits provided by the water environment. It also informs decisions on land-use planning.

8.40. The RBMP identifies a number of significant water management issues, including pollution from wastewater, rural areas, towns, cities and transport, and the physical modifications to the natural size and shape of water courses. A number of measures to combat stressors upon the regional water environment are discussed, those of most relevance to the Proposed Development include:

- *"Local government considers the impact on water quality in their preparation of spatial plans, decisions on spatial planning, development management, new buildings, and infrastructure;*
- *Local government uses planning conditions, legal agreements and enforcement powers under the Town and Country Planning Act 1990 to prevent or stop pollution from developments, roads, and other infrastructure;*
- *Local government makes sure that new developments address potential pollution problems by using sustainable drainage systems to manage surface water; and*
- *Local government sets out local plan policies requiring new homes to meet the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010."*

## Local Planning Policy

### Local Flood Risk Management Strategy (LFRMS) (Manchester City Council (MCC), 2014)

8.41. The LFRMS was adopted in 2014 and is a requirement under the Flood and Water Management Act 2010 and ensures that local flood risk is properly managed by using the full range of options in a coordinated way.

8.42. The Strategy states a number of policies, including LFRM Policy 6: Ensure that local flood risk is properly considered for new development proposals. It states that the Lead Local Flood Authority (MCC) should engage in the planning process to ensure flood risk is appropriately considered in new developments/landscaping.

8.43. All rivers in Manchester ultimately drain into the Manchester Ship Canal and from there to the Irish Sea. They are also three broad canals in Manchester: the Ashton Canal and the Rochdale Canal which extend from the City Centre through east and north Manchester to Ashton under Lyne and Rochdale respectively.

8.44. The two catchments covering Manchester are the Irwell and the Upper Mersey. the Site is within the Irwell Catchment. Both Manchester catchments eventually drain into the Irish Sea via the Manchester Ship Canal. Although named as a canal, the Ship Canal is a 'canalised' river and hence its flooding mechanisms have more in common with a river than a typical canal.

8.45. The Ashton Canal passes the north of the Site. This canal extends eastwards into Tameside. Both the Ashton and Rochdale Canal converge in the City Centre and are both owned by the Canal and River Trust.

### Manchester Green and Blue Infrastructure Strategy (2015)

8.46. MCC's Green and Blue Infrastructure Strategy sets out a vision for how the city will continue to grow and evolve over the 10 years from 2015 – 2025. The Strategy acknowledges that Manchester's green infrastructure has been part of the city's success. The green and blue spaces that exist within urban areas include the five river valleys, three canals, over 160 parks, street trees, woodland, private gardens, and other areas of natural environment.

8.47. The vision is as follows:

*"By 2025 high quality, well maintained green and blue spaces will be an integral part of all neighbourhoods. The city's communities will be living healthy, fulfilled lives, enjoying access to parks and greenspaces and safe green routes for walking, cycling and exercise throughout the city. Businesses will be investing in areas with a high environmental quality and attractive surroundings, enjoying access to healthy, talented workforce. New funding models will be in place, ensuring progress achieved by 2025 can be sustained and provide the platform for ongoing investment in the years to follow."*

8.48. The Strategy sets out four main objectives which enable the vision to be achieved:

*"1. Improve the quality and function of existing green and blue infrastructure, to maximise the benefits it delivers;*

*2. Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city's growth;*

*3. Improve connectivity and accessibility to green and blue infrastructure within the city and beyond; and*

*4. Improve and promote a wider understanding and awareness of the benefits that green and blue infrastructure provides to residents, the economy, and the local environment."*

### Manchester Core Strategy Development Plan Document 2012-2017 (2012)

8.49. Manchester's Core Strategy was adopted in 2012 and is a key Development Plan document in the Local Development Framework, setting out the long-term strategic policies for Manchester's future

development and forming the framework against which planning applications will be assessed. The relevant policies with regard to water resource and flood risk are listed below:

- Policy EN8 Adaptation to Climate Change states that all new development 'will be expected to be adaptable to climate change', through a range of measures such as surface water drainage, green infrastructure, and passive design;
- Policy EN9 Green Infrastructure states that new development 'will be expected to maintain existing green infrastructure' where the opportunity arises, including the city's rivers and canals;
- Policy EN14 Flood risk states that an 'appropriate FRA will also be required for all development proposals' and that 'all new development should minimise surface water run-off, including through SuDS) and the appropriate use of Green Infrastructure'; and
- Policy EN17 Water Quality states, 'development should avoid any adverse impact on water quality, including during the construction phase' and 'should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses'.

### Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (2007)

8.50. This document was officially adopted in 2007 and aims to support and enhance the ongoing shaping of the City by providing a set of reasoned principles to guide developers, designers, and residents to the sort of development we all want to see in Manchester. It sets out MCC's stance on a wide range of issues, demonstrating, where applicable, their links to the Manchester Unitary Development Plan (UDP).

8.51. The guide covers environmental standards of specific interest to this Chapter, including a section on water management and weather resilience. This refers to applicable UDP policy around groundwater and watercourse pollution, surface water runoff and incorporation of SuDS, identifying areas of flood risk, the effects of climate change and using water efficiently.

### Other relevant policy and guidance

### Pollution Prevention Guidance (PPG) (now withdrawn)

8.52. The former EA PPG notes provided advice on statutory responsibilities and good environmental practice. Whilst this guidance was withdrawn in December 2015 and will no longer be updated by the EA, it is still considered good practice. The guidance notes of particular relevance to the Proposed Development include:

- PPG1: General Guide to the Prevention of Pollution, which introduces pollution prevention and the pollution prevention guidance notes
- PPG2: Above Ground Oil Storage Tanks, which provides guidance to those responsible for the storage of oil on construction sites. The document provides guidance on location, bunding, protection and operation of oil stored in addition to maintenance and brief guidance on dealing with spills
- PPG3: Use and Design of Oil Separators in Surface Water Drainage Systems, which provides guidance on when oil separators are appropriate and what size and type of separators is required
- PPG5: Works In, Near or Liable to Affect Watercourses which provides guidance on general precautions to take when working in the vicinity of a watercourse, along with more specific measures to prevent contamination and to minimise and adverse impacts
- PPG6: Working at Construction or Demolition sites. This document mirrors much of PPG5 but with particular emphasis on the situations likely to occur at demolition and construction sites
- PPG7: Refuelling Activities. This provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk of pollution

- PPG21: Pollution Incident Response Planning. This provides guidance to those developing site-specific pollution incident response plans to prevent and mitigate damage to the environment caused by accidents such as spillages and fires

### Construction Industry Research and Information Association (CIRIA) Guidance

8.53. CIRIA carries out research activities and provides guidance for developers and contractors. The guidance with specific relevance to water resources and flood risk are:

- Guidance C532 – Control of Water Pollution from Construction Sites. This brings together the EA guidance but goes into much more detail with regard to sources of water on construction sites, pollutants, and pathways, in addition to providing guidance on planning for the type and location of suitable control measure
- Guidance C753 – The SuDS Manual. This provides best practice guidance on the planning, design, construction, operation, and maintenance of SuDS to facilitate their best effective implementation within development

## Assessment Methodology and Significance Criteria

## Methodology

### Baseline Assessment

8.54. The baseline assessment covers the Site and surrounding areas which may impact the Proposed Development or be susceptible to impact because of the Proposed Development. This includes water bodies (i.e. River Medlock). The baseline review considers the following baseline scenarios:

- Scenario 1: Existing site, baseline (conditions in 2023) with committed development
- Scenario 2: Scenario 1 plus Proposed Development
- Scenario 3: Scenario 2 plus mitigation
- Future baseline (2026) – account for how the baseline condition could change by the year of completion, in the absence of the Proposed Development (referred to as the 'do nothing' scenario)

### Assessing the Proposed Development

8.55. The methodology adopted in this ES Chapter involves the following:

- Review of international, national, and local legislation, policies, and guidelines in relation to water resources, water quality and flood risk
- Establishment of baseline conditions on and around the Site through a literature review and analysis of existing data obtained from the EA and UU
- Identification of sensitive receptors through desk study and consultation with the EA as reported within the FRA for the Proposed Development, and with UU as reported in the Surface Water Drainage Strategy and utilities report for the Proposed Development
- Identification of risks to water quality, water resources and flooding from the Proposed Development and hence the likely effects, magnitude of change and significance of environmental effects during both the construction and operational phases
- Development of mitigation strategies through consultation with the design team
- Identification of opportunities for enhancement of surface water quality and surface water management through design and mitigation
- Identification of residual effects and identification of cumulative effects

## Significance Criteria

8.56. The methodology used for the assessment of water resources, flood risk, drainage and water quality effects broadly align with the generic approach. However, the receptor sensitivity criteria are more expansive, including a 'negligible' category, and the terminology used for magnitude of change or impact is different (albeit directly comparable with the generic assessment). Therefore, the resulting significance matrix is slightly different to that within the generic assessment, as presented below.

### Magnitude of Impact

8.57. The criteria used to assess impact magnitude is described in Table 8.1.

Table 8.1 Criteria for determining magnitude of change/impact.

| Magnitude of impact | Criteria for assessing impact |
|---|---|
| Major | Total loss or major/substantial alteration to key element/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.<br><br>Wholesale changes to the watercourse channel, route or hydrology. Significant changes to soil erosion or sedimentation patterns. Major changes to the water chemistry of surface runoff and groundwater.<br><br>Changes to the Site resulting in an increase in discharge/runoff with flood/sewerage exceedance potential. A large increase to flood risk of water bodies and areas downstream. A large risk of flooding to site infrastructure and users, as determined by an on-site FRA in accordance with NPPF. |
| Moderate | Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/condition/attributes of the baseline will be materially changed.<br><br>Some fundamental changes to the watercourse and hydrology. Moderate changes to soil erosion or sedimentation patterns. Moderate changes to the water chemistry of surface run off and groundwater.<br><br>Changes to the Site resulting in an increase in discharge/run-off within system capacity. A medium increase to flood risk of water bodies and areas downstream. A medium risk of flowing to site infrastructure and users, as determined by an onsite FRA in accordance with NPPF. |
| Minor | A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-development circumstances/situation.<br><br>Minor changes to watercourses. Minor changes to soil erosion or sedimentation patterns. Minor changes to the water chemistry of surface run off and groundwater.<br><br>Changes to the Site resulting in slight increase in discharge/run-off within system capacity. discharge/run-off within system capacity. A small increase to flood risk of water bodies and areas downstream. A small risk of flooding to site infrastructure and users, as determined by an onsite FRA in accordance with NPPF |

| Magnitude of impact | Criteria for assessing impact |
|---|---|
| Negligible | Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.<br><br>No change to the watercourse, runoff and soil erosion and sedimentation patterns and water chemistry.<br><br>Very minor to no change in discharge runoff and increased pressure on sewer capacity.<br><br>No increased flood risk to water bodies and areas downstream. No risk of flooding to site infrastructure and users, as determined by an onsite FRA in accordance with NPPF. |

Receptor Sensitivity

8.58. The criteria used to assess receptor sensitivity is described in Table 8.2.

Table 8.2 Criteria for determining receptor sensitivity

| Sensitivity | Examples of receptor |
|---|---|
| High | Water body of high amenity value, including areas of bathing and where water sports are regularly practiced.<br>Water body of good or high chemical or ecological status. Includes designated bathing waters, shellfish, and salmonid fisheries.<br>A source used for public water supply or designated as a source protection zone. Site of Special Scientific Interest (SSSI), Special Protection Area (SPA)/Special Area of Conservation (SAC), Ramsar site or highly sensitive aquatic ecosystem.<br>Water bodies currently failing water quality objectives.<br>Areas which are highly vulnerable. With reference to flood risk, these can include essential infrastructure, individuals on-site or downstream, emergency services and basement dwellings.<br>Essential infrastructure which is already operating at capacity and will require capacity improvements to manage demand. |
| Moderate | Water body of moderate amenity value including public parks, boating, non-contact sports, popular footpaths adjacent to water courses, or water courses running through housing developments/town centres.<br>Water body of moderate ecological status and/or non-public water supply or cyprinid fishery.<br>Water body of nature conservation importance at the regional level or a moderately sensitive aquatic ecosystem e.g. Site of Nature Conservation Interest (SNCI).<br>Areas which are more vulnerable. With reference to flood risk, these can include hospitals, homes, educational facilities, and waste management sites.<br>Essential infrastructure which is not yet operating at capacity but could either reach capacity with the construction and operation of the Proposed Development, or potentially require capacity improvements to manage demand. |
| Low | Water body of poor ecological status. A source in close proximity to a source protection zone or abstraction point.<br>Water body of particular local social/cultural/educational interest. Water body of low amenity value with only casual access, e.g. along a road or bridge in a rural area. |

| Sensitivity | Examples of receptor |
|---|---|
| | Areas which are less vulnerable. With reference to flood risk, these can include retail, commercial and general industrial units, agricultural/forestry sites, and water/sewage treatment plants.<br>Essential infrastructure which is not operating at capacity and is not anticipated to require capacity improvements to manage demand |
| Negligible | Low sensitivity aquatic ecosystem.<br>Water of poor ecological status.<br>Water body of no amenity value, seldom used for amenity purposes, in a remote or inaccessible area.<br>Areas which are considered to be water compatible. With reference to flood risk, these can include flood control infrastructure, docks/marinas, pumping stations and recreational/landscape areas. |

### Significance evaluation

8.59. The significance of a potential effect is derived by considering both the sensitivity of the receptor and the magnitude of change, as demonstrated in Table 8.3. Where effects are described as 'Moderate/Minor', the author of this technical ES chapter has assessed whether effects are minor adverse (i.e., not significant) or moderate adverse (i.e., significant) based on professional judgement.

Table 8.3 Matrix for determining effect significance

| | Sensitivity | | | |
|---|---|---|---|---|
| Magnitude | High | Moderate | Low | Negligible |
| Major | Major Adverse/Beneficial | Major – Moderate Adverse/ Beneficial | Moderate – Minor Adverse/ Beneficial | Negligible |
| Moderate | Major – Moderate Adverse/Beneficial | Moderate – Minor Adverse/ Beneficial | Minor Adverse/Beneficial | Negligible |
| Minor | Moderate – Minor Adverse/Beneficial | Minor Adverse/Beneficial | Minor – Negligible | Negligible |
| Negligible | Negligible | Negligible | Negligible | Negligible |

8.60. Note that moderate and major effects are considered to be 'significant' for the purposes of this assessment.

8.61. Effects can also be described, for example as:

- Beneficial or adverse
- Permanent or temporary
- Short, medium, or long term

## Baseline Conditions

8.62. This section presents the existing baseline conditions on the Site and within the surrounding area during the assessment year (2023).

### Existing Land Use

8.63. Chapter 4, Site and Development Description, of the ES provides a full description of the current site use.

8.64. The Site is approximately 3.5 ha and is situated within the Etihad Campus, East Manchester.

8.65. The Site is bounded by Joe Mercer Way and the Metrolink tracks to the north with the Ashton Canal sitting just beyond these tracks, The National Squash Centre to the west, the remainder of the Etihad Stadium to the south and Alan Turing Way to the east.

### Existing Site Level

8.66. The Site is considered to be relatively flat. The highest point on the Site is in the eastern side within the existing gravel car park with approximate level of +62.64m Above Ordnance Datum (AOD). The Site slopes down towards the southwest to a low point adjacent to the Etihad Stadium at a level of approximately +60.44mAOD.

8.67. The Site levels reduce approximately 2.20m over a distance of approximately 150m – east to west – giving an average gradient of 1:75.

### Existing Surface water features

8.68. The nearest water feature to the Site is Ashton Canal, approximately 35m to the north of the Site boundary.

8.69. The nearest natural watercourse to the Site is the River Medlock, approximately 170m to the northwest which is designated as a Main River. The River Medlock is culverted to the north of the site, running below the car parks to the north of Sportcity Way, crossing beneath Sportcity Way and running beneath the car park to the west of the Tennis and Football Centre (see **Error! Reference source not found.**1). The culvert is approximately 200m to the north of the Site.

8.70. The source of the River Medlock rises in the hills to the east of Oldham. It flows through Oldham and Tameside before reaching Clayton, Manchester. The lower reaches of the river join the River Irwell in Central Manchester and are extensively culverted. The floodplain of the River Medlock is relatively natural through Clayton Vale. The Medlock is culverted under the Etihad Stadium and continues to meander in and out of culvert through city centre.

### Existing Surface Water and Foul Water Drainage

8.71. The majority of the existing site is drained via an existing private drainage network which discharges into a public sewer in the north of the site.

8.72. The existing site is 3.48ha. Approximately 2.46ha is positively drained hardstanding and buildings, of which 1.87ha is proposed to be modified by this project and 0.59ha is to remain unchanged.

8.73. An additional 0.91ha is a gravel car park with no positive drainage system and therefore considered greenfield land. The remaining 0.11ha is soft landscaping, consisting of steep grass banks leading down to the National Squash Centre and the Metrolink tram stop platform, and which likewise are to remain unchanged.

8.74. The existing surface runoff discharge rate has been calculated to be 70.5l/s. This consists of an existing brownfield discharge rate for the positively hardstanding of 64.6l/s and a greenfield runoff rate for the

non-positively drained gravel car park has been calculated as 5.91l/s. This is further detailed in the Surface Water Drainage Strategy.

8.75. The theoretical pipe full capacity check has been undertaken based on individual runs within the site and checking against cumulative area as the run progresses through the site. This check has shown that the flow discharging offsite is limited to 306l/s. Therefore the existing pipe sizes are not considered to restrict the flow off-site.

8.76. Information obtained from UU indicates the following drainage systems are present in the vicinity of the Site:

- 850mm diameter surface water sewer running east to west through the north of the Site;
- 900mm diameter combined sewer running from south to north on the east side of the Site;
- 375mm diameter concrete sewer running from south to north on the west side of the Site;
- 375mm diameter vitrified clay sewer running along the northern boundary of the site; and
- 550mm x 950mm running along the northern boundary of the Site

8.77. It is understood that surface water from the Site currently drains to the UU sewer to the north of the Site. It is understood that this sewer subsequently flows into the River Medlock. Although it is unlikely that there is a connection between the UU sewer and the Ashton Canal, this is not currently known for certain, therefore the assessment assumes that there is a connection as a worst-case scenario approach.

## Water Quality – River Medlock

8.78. The River Medlock falls within the North-West River Basin District. The associated River Basin Management Plan establishes several requirements that must be met to comply with the WFD.

8.79. The River Medlock is located to the north of the Site and within the Medlock (Lumb Brook to Irwell) water body catchment. It is classified as heavily modified due to physical changes from flood protection and urbanisation measures. Therefore, it has an obligation to achieve 'good ecological potential'. Artificial and heavily modified water bodies are not able to achieve natural conditions. Instead, the classification and objectives for these water bodies, and the biology and habitat structure they provide an environment for, are measured against ecological potential rather than status.

8.80. The ecological and chemical classification of the River Medlock were last assessed by the EA in 2019.

8.81. The ecological potential of the river at this section was classified as 'moderate' owing to its poor biological quality (specifically for fish), and high levels of specific pollutants.

8.82. Chemical status considers polluting substances listed within the European Union Dangerous Substances Directive. The chemical status of the River Medlock was classified as 'fail' in 2019 (see Table 8.4). However, for the 2019 assessment, the method changed and due to this all bodies of water now fail chemical status and this assessment is not comparable to previous years, when 'good' was achieved.

Table 8.4 WFD classification for the River Medlock (EA Catchment Data Explorer, accessed January 2023)

| Classification Item | 2013 | 2014 | 2015 | 2016 | 2019 |
|---|---|---|---|---|---|
| Overall Water Body | Moderate | Moderate | Moderate | Moderate | Moderate |
| Ecological | Moderate | Moderate | Moderate | Moderate | Moderate |
| Chemical | Good | Good | Good | Good | Fail |

## Groundwater

8.83. Geotechnical Engineering Ltd carried out a ground investigation in 2022. This concluded that the geology beneath the site comprises Carboniferous Pennine Upper Coal Measures (at about +45mOD), overlain by approximately 11m of Glacial Till. Made Ground was encountered to varying depths, ranging between 3m and 8m bgl.

8.84. Groundwater monitoring was carried out as part of the ground investigation. Monitoring began during the investigation, upon completion of the installation and then continued as part of a six-week monitoring programme. Groundwater levels within the Coal Measures ranged between +37.7mOD and +42.0mOD. Direction of groundwater flow is considered to be west/southwest following the direction of the River Medlock. Data obtained from the ground investigation does not present any obvious groundwater flow direction through slightly lower levels in the groundwater monitoring were recorded to the east of the site. There are no groundwater abstractions located within 500m.

8.85. Potential groundwater pollution of the Proposed Development will be covered further within ES Chapter 9, Ground Conditions.

## Water Supply and Existing Demand

8.86. UU supplies water in this location. the Site is situated within UU's 'Strategic Resource Zone'. More than 90% of UU's water supply is derived from rivers and reservoirs, with the remainder from groundwater. The UU principal water sources are:

- Reservoirs in the Pennines and the Lake District;
- Boreholes; and
- Streams.

8.87. UU published its latest Water Resource Management Plan in August 2019 (WRM19). The WRM19 covers the 25-year period from 2020 to 2045 and sets out its strategy to achieve a long-term, best value and sustainable plan for water supplied in the North West, ensuring it has an adequate supply to meet demand.

8.88. The WRM19 forecasts a supply surplus over the 20 years from the current baseline year, 2023, up to 2040. A 'very small' deficit from 2041 to 2045 is expected within the Strategic Resource Zone. To address the anticipated deficit, UU proposes a focus on reducing the loss of water from system leakage. The target is for leakage reductions of 20% by 2025, followed by a longer-term plan to reduce leakage by just over 40% by 2045.

8.89. It should be noted that the EA has not identified the area UU serves as one under serious water stress. Their 'Water Stressed Areas – Final Classification 2021' report finds the regions water stress to be 'Not Serious'.

## Flood Risk

8.90. A detailed assessment of existing flood risk to the Site is provided in the FRA (Appendix 8.1). A summary of baseline conditions relating to flood risk is provided here.

### Fluvial and Tidal Flooding

8.91. Fluvial flooding occurs when sustained or intense rainfall events increase the flow in rivers causing the water level to rise above the level of the banks and into the surrounding areas.

8.92. Tidal flooding occurs when particularly high tides coincide with storm surges. Storm surges are caused by low atmospheric pressure events resulting in temporary localised raising of sea levels.

8.93. The entirety of the Site is located within Flood Zone 1 (Figure 8.2), which is defined as having a low risk of flooding, with a probability of flooding of less than 1 in 1,000 years (0.1%) in any given year, from rivers and the sea.

8.94. Flood Zone 1 is defined as a low probability of fluvial or tidal flooding, with less than a 1 in 1000-year annual probability (<0.01% AEP) of flooding. Therefore, the risk of fluvial and tidal flooding is considered low (Figure 8.3).

8.95. The nearest natural watercourse to the Proposed Development is the River Medlock, which is culverted approximately 200m north. Therefore, tidal and fluvial flood risk is considered to be low and additional measures to reduce this risk will not be required.

8.96. Records of historic flooding are useful for looking at the sources, seasonality, frequency and intensity of flooding. Although historic records can be incomplete, they provide useful background information. The Site location is not within the EA's recorded historic fluvial flood extent, and the nearest recorded historical fluvial flood event was located over 3km from the Site. The SFRA also did not record any historic flood events for the area of interest.

### Flooding from Surface Water

8.97. Surface water flooding occurs when intense rainfall is unable to naturally soak into the ground due to impermeable ground covering such as concrete or tarmac, or low permeability ground conditions preventing infiltration. This excess surface water can flow through built-up areas and open space and pond in lower-lying areas causing localised flooding.

8.98. The surface water flood map produced by the EA (Figure 8.4) indicates that the majority of the Site is classified as having a low or very low probability of surface water flooding. The areas considered to be at low risk of surface water flooding, include the radial footway around the Etihad Stadium, and the proposed access location at Gibbon Street/Alan Turing Way. Where there are areas of low risk, the Surface Water Drainage Strategy will take measures to reduce this risk.

8.99. It should also be noted that outside of the Site boundary, south of the proposed access point on Alan Turing Way, there is an area of medium/high surface water flood risk. This is in the location of a depression in the road profile, and therefore is not considered to pose a risk to the Site.

### Flooding from Groundwater

8.100. Groundwater flooding generally occurs in low-lying areas above permeable rock aquafers where the water table meets and rises above the ground surface.

8.101. The Site located on Carboniferous Pennine Upper Coal Measures, overlain by Glacial Till. The Site has a significant industrial past, including coal mining, meaning the geological makeup is complex. This is explored further in ES Chapter 9, Ground Conditions. The SFRA provides detail on areas which are considered to be susceptible to groundwater flooding, of which the Site is not identified. Therefore, the baseline risk of groundwater flooding is considered likely to be low, but to be confirmed by the proposed groundwater monitoring.

### Flooding from Minewater Rebound

8.102. Minewater rebound could be a potential groundwater flooding issue at historic mine-workings. It occurs when groundwater levels rise following cessation of mine dewatering. The Coal Authority is responsible for monitoring the levels. According to the Level 1 SFRA (2010), 'the Coal Authority considers minewater levels in Manchester, Salford and Trafford to have recovered or almost recovered. Some areas are likely to experience slight rebound, but the effects of this will be minimal.' This is explored further in ES Chapter 9, Ground Conditions.

### Flooding from Sewers

8.103. Flooding from sewers may occur during periods of intense rainfall when high volumes of surface water run-off exceed the capacity of the sewer and cause the pipes to back up and overflow.

8.104. There is an intricate and well-connected network of rivers, streams, sewers and canals within Greater Manchester; however, limited information exists in the SFRA regarding flooding from sewers. The Site is not an area highlighted at risk from flooding from sewers.

8.105. UU maintains a record of flooding from public sewers, Historical flood events provide an understanding of the inadequacies of the sewer system that have been realised in the past; however, this does not give a definitive understanding of the future flood risk associated with sewers.

### Flooding from artificial sources

8.106. Artificial sources include ponds, lakes, canals, and reservoirs. These can flood in the event of a structural failure or during peak storm events. The failure of an artificial source of water has the potential to cause catastrophic damage to its surroundings due to the sudden release of large volumes of water. However, the likelihood of such a failure occurring is extremely low. The Site is not located downstream of any reservoirs, and the EA flood extent maps suggest no flood risk from reservoirs.

8.107. Ashton Canal passes close to the north boundary of the Site. Ashton Canal is a broad canal, meaning that it is a controlled water body with regulated flow. Ashton Canal is considered to have residual risks associated with lower probability events such as breaching, and the Site area is identified at potential risk of canal flooding in the SFRA.

8.108. Ashton Canal is a broad canal which does not pose a direct flood risk as it is a controlled water body with a regulated flow. Therefore, the residual risk of canal flooding is usually associated with lower probability events such as overtopping and/or the breaching of embarkments. The residual risk associated with canals is unknown as it depends on several factors including: the source of water into the canal, materials used within the canal embankments and the condition of those embankments. The risk is limited due to continued maintenance by the Canal and Rivers Trust.

8.109. The Ashton Canal runs close to the Site and is considered to have some residual risks with low probability events such as breaching. However, the Proposed Development is significantly elevated compared to canal levels, so the risk of flooding from artificial sources is considered to be low.

8.110. The main residual risks on the Ashton Canal are considered to be overtopping or breaching. This may occur as a result of high inflows to the canal during flood conditions, or a blockage in the canal. The SFRA considers this risk to be low due to continued canal maintenance by Canal and Rivers Trust.

8.111. The Site is significantly elevated relative to the canal level, which further reduces the risk to the Proposed Development.

8.112. It is concluded that the Proposed Development is at a low risk of flooding from artificial sources and will have no impact in terms of flood risk to the surrounding area.

## Future Baseline (2026)

8.113. The future baseline is the year 2026. In the absence of the Proposed Development, the land use and site levels will likely remain unchanged. The nature of the identified water environment is likely to be unchanged in terms of sensitivity to that of the current baseline.

### Water Quality

8.114. If the Proposed Development did not go ahead, conditions of the River Medlock and Ashton Canal would likely continue to improve. The River Medlock will need to continue to work towards achieving the requirements of the WFD. Once the requirements are met, they would need to be maintained.

### Surface Water Network

8.115. In the absence of the Proposed Development, the future baseline with respect to identified surface water features and receptors is anticipated to remain unchanged. The surface water network will therefore retain its classification.

### Drainage Network (Foul Water)

8.116. In the absence of the Proposed Development, the future baseline with respect to the foul water drainage network is anticipated to remain unchanged.

### Flood Risk

8.117. Flood risk on the Site for the future baseline is likely to remain similar to that covered by the current baseline. The flood zone mapping outlined in the baseline section contains an allowance for the future effects of climate change.

### Water Supply

8.118. As noted previously, UU's WRMP19 forecasts a water supply surplus from 2020 to 2040, spanning both current and future baseline years.

8.119. However, UU identifies the possibility of a future supply deficit in the Strategic Resource Zone – the zone in which the Site area is located. Whilst this is not anticipated until 2041, UU has proposed to undertake some early measures to mitigate this risk. Its focus will be on reducing the loss of water from system leakage. The target is for leakage reductions of 20% by 2025, and just over 40% by 2045.

8.120. Whilst these measures may improve further water supply to the Site area in 2026 when compared to 2023, in the context of an already abundant water supply, the future baseline is unlikely to change in terms of sensitivity to that of the current baseline.

## Identification and Evaluation of Significant Effects

### Identified receptors and their sensitivity

8.121. Potential receptors have been identified through the assessment of baseline conditions. Sensitivities have been applied as indicated in Table 8.5 below.

Table 8.5 Identified receptors and their sensitivity during construction and the operation phase

| Receptor | Sensitivity | Justification |
|---|---|---|
| River Medlock: water quality | High | Failure to meet the chemical and ecological quality standards of the WFD |
| Ashton Canal: water quality | High | Failure to meet the chemical and ecological quality standards of the WFD |
| Water services infrastructure: surface water drainage capacity | Moderate | On site drainage infrastructure should be appropriately sized. |
| Water services infrastructure: foul drainage capacity | Moderate | There are currently no known capacity issues with regard to the foul water network. |
| Water services infrastructure: supply | Moderate | UU water is not under serious stress |

| Receptor | Sensitivity | Justification |
|---|---|---|
| Site users: human health and safety | High | Flood risk to site workers during construction including consideration of flood risk downstream. |

## Construction effects

8.122. Enabling works will comprise ground works, excavation and piling before building construction begins. Enabling and construction work is expected to occur between 2023 and 2026.

## Relevant aspects of the Proposed Development

8.123. The risks to the water environment during construction include:

- Increased water demand from construction uses;
- Increase in sediment loads caused by site run-off containing elevated suspended sediment levels. This can result from land clearance, excavation, dewatering of excavation, stockpiling, bunding, wheel washing and movement of materials to and from the Site;
- The release of hydrocarbons and oils into the on-site drainage system due to a large number of vehicles accessing the Site, leakage from oil/fuel storage tanks and accidental spillages;
- Accidental leaks and use of hazardous materials, particularly concrete and cement products, which can be contained in uncontrolled wash-down water and surface water run-off;
- Dust and debris caused by poor management of the Site;
- Leaks or breakage of temporary sewerage system infiltration groundwater and/or mitigating to surface waters; and
- Flood risk associated with excavations.

8.124. These effects can be identified as temporary (construction activities) or permanent. Risks relating to the water environment are discussed in detail in this section and are summarised in Table 8.6.

## Potential effects of the Proposed Development and their significance

8.125. This section presents the assessment of construction effects from the Proposed Development i.e., the 'existing site with Proposed Development' scenario.

### Increased sediment load

8.126. Site run-off containing elevated suspended sediment levels can result from land clearance, excavation, dewatering of excavation, stockpiling, bunding, wheel washing and movement of materials to and from the Site. Run-off with high sediment loads can have adverse effects on water bodies through increasing turbidity (thus reducing light penetration and reducing plant growth), and by smothering vegetation and bed substrates (thus impacting upon animal communities through the destruction of feeding areas, refuges, and breeding/spawning areas).

8.127. Indirect adverse effects can also be associated with suspended sediments that have inorganic or organic contaminants (e.g., heavy metals and pesticides respectively). Sediment can additionally cause issues within runoff channels through clogging and blockages resulting in reduced flow capacity.

8.128. Water quality with respect to sediment load in the River Medlock and Ashton Canal could be influenced directly if construction site drainage and dewatering is discharged to the UU sewer, which subsequently drains to the River Medlock and potentially also the Ashton Canal. The magnitude of effects is deemed to be major. When considering the high sensitivity of the receptor, the overall significance of effect is considered to be major adverse for water quality in River Medlock and the Ashton Canal.

### Hydrocarbons and oils

8.129. The release of hydrocarbons and oils into the on-site drainage system is a common form of pollution within urban areas. There is a risk such pollution will increase during construction due to track out, with greater numbers of vehicles accessing the Site. This increase will likely include a significant number of heavy duty vehicles. Increased vehicle movements result in a greater likelihood of leakage from oil/fuel storage tanks and accidental spillages. Oils and fuels that are washed from surfaces into the on-site drainage system are likely to discharge to the UU sewer, which subsequently drains into the River Medlock and potentially also the Ashton Canal.

8.130. Hydrocarbons form a film on the surface of the water body, deplete oxygen levels and can be toxic to freshwater fish. Even at very low concentrations the film can negatively affect the visual appearance of the water body. The effect would be temporary, and water quality within the affected water body would improve over time as pollutants disperse and are treated by natural processes.

8.131. The River Medlock and Ashton Canal could be influenced by hydrocarbons directly if site drainage finds its way into the river and/or canal via the UU sewer. The magnitude of effects is deemed to be major. When considering the high sensitivity of the receptors, the overall significance of effect is considered to be major adverse for water quality in River Medlock and the Ashton Canal.

### Accidental leaks of and use of hazardous materials

8.132. Accidental leaks and spillages of hazardous materials could adversely affect the quality of downstream water bodies and groundwater through infiltration.

8.133. The use of concrete, cement and mortar products on-site can present a pollution risk because of the potential for uncontrolled release of wash-down and surface water run-off. If these activities are not carried out in designated areas, wastewater may enter a water body and adversely affect the sewerage and aquatic environment. Concrete products are highly alkaline and corrosive, fish can be physically damaged, and their gills blocked, and both vegetation and the bed of the water body can be smothered.

8.134. During construction there is an elevated risk of potential leaks or accidental spillage of hazardous chemicals, such as solvents, paints, or cement-based products, infiltrating to groundwater or migrating to surface water bodies. However, it is only when large quantities of hazardous materials are spilled, or the spillage is directly into the water body, that a significant risk of acute toxicity will arise in the receiving water body. The magnitude of any change will depend on the scale and nature of any potential incident and thus is difficult to predict.

8.135. These effects are likely to be temporary. Water quality within the affected water body will improve over time as pollutants are dispersed and diluted.

8.136. The River Medlock and Ashton Canal could be influenced by accidental leaks of hazardous materials getting into surface runoff, via the UU sewer. There is potential for a moderate magnitude of impact on these water bodies, and the sensitivity of the receptors are deemed to be high. Therefore, the overall significant effect is considered to be major adverse for water quality in the River Medlock and the Ashton Canal, in the absence of further mitigation.

### Dust and debris

8.137. Construction activities located onsite have the potential to release dust and debris that may be blown into adjacent water bodies.

8.138. Increased dust levels in water bodies may reduce the levels of light reaching aquatic plant and animal species. Debris blown into water bodies can decrease the recreational and aesthetic quality of the water body. However, effects will be temporary; water quality within the affected water body will improve over time as dust and debris settle or are trapped by vegetation.

8.139. Sediment/debris can additionally cause issues within surface water sewer networks through clogging/blocking, a reduction in flow capacity and premature operation.

8.140. The effect of dust blowing directly into water bodies will depend on the distance between the Site and receptor. It will also depend upon the Site practices and mitigation measures employed, for instance the use of dust suppression techniques. Given the proximity of Ashton Canal to the north boundary of the Site and the receptor's high sensitivity, the magnitude is considered major, and the effect significance has been placed at major adverse in the absence of mitigation. It should be noted that the River Medlock is considered too distant to be potentially affected by this issue.

### Leak or Breakage of The Temporary Sewerage System

8.141. Leaks and breakages of sewers from the temporary toilet facilities on-site during the construction works may result in crude sewage infiltrating groundwater or being washed into the drainage system. Sewage contains high levels of nutrients, organic matter, coliforms, and suspended solids. These can result in nutrient enrichment and eutrophication, smothering of bottom-dwelling organisms and plants, and significantly reduced oxygen levels. The effect would be temporary however, as water quality within the affected water body would improve over time as organic matter is dispersed and treated by natural processes.

8.142. As surface water from the Site flows into the River Medlock, and potentially also the Ashton Canal, via the UU sewer, this could be influenced by leakage or breakage of the temporary sewage system. There is potential for a major magnitude of impact on this water body, and the sensitivity of the receptor is deemed to be high. Therefore, the overall significance is considered to be major adverse for water quality in the River Medlock and the Ashton Canal, in the absence of further mitigation.

### Increased water demand

8.143. Processes during the site preparation, excavation and construction phases of the Proposed Development may require significant volumes of water supply including sanitary facilities for site staff, and water supply for wheel washing and washing down of construction areas.

8.144. The magnitude of change on strategic water supplied will be minor. As the sensitivity of the receptor is moderate, this results in a likely minor adverse temporary/short-term effect on strategic water supplied without further mitigation.

### Dewatering of Excavations

8.145. The dewatering of excavations may need to be discharged to the sewerage network or the River Medlock under formal agreement with UU or the EA. The magnitude of change on the capacity of the sewer network is considered to be medium. Therefore, the significance of the potential effect is potentially moderate adverse.

### Flood Risk to Workers and Construction Plant

8.146. Whilst the Site is situated in flood zone 1, there is the potential for areas of localised flooding along the River Medlock. Without appropriate mitigation to protect construction workers from possible excavation flooding, fluvial flooding and surface water flooding risks to the Site, the magnitude of change on the construction workers and plant is likely to be minor while the sensitivity of the receptor is deemed to be high. Therefore, the significance of effect is considered to be moderate adverse, without further mitigation.

## Climate change and adaptation

8.147. The construction period is planned to last until 2026. Although climate forecasts show that because of climate change, Manchester is likely to experience slightly wetter winters and drier summers, this time frame is not significant and current climatic conditions are considered representative of the climate during the construction period.

8.148. Therefore, based on the current climatic forecasts during the construction period and the construction timeframe, there is not a need for specific adaptation measures to reduce the risk from climatic effects during construction. There may be an increased risk of extreme weather events, and prudence must be taken during construction to be aware of local forecasts and allow for flexibility in approach to construction work as appropriate at the time. Specifying adaptation measures at this stage is not deemed necessary.

## Summary of effects

Table 8.6 Summary of effects during construction

| Receptor | Sensitivity | Description of effect | Magnitude of change/impact | Effect significance |
|---|---|---|---|---|
| River Medlock: water quality | High | Increased sediment load | Major | Major adverse, Short term, reversible |
| | | Hydrocarbon and oils | Major | Major adverse, Short term, reversible |
| | | Accidental leak of and use of hazardous materials | Major | Major adverse, Short term, reversible |
| | | Leak or breakage of the temporary sewerage system | Major | Major adverse, Short term, reversible |
| Ashton Canal: water quality | High | Increased sediment load | Major | Major adverse, Short term, reversible |
| | | Hydrocarbon and oils | Major | Major adverse, Short term, reversible |
| | | Dust and debris | Major | Major adverse, Short term, reversible |
| | | Accidental leak of and use of hazardous materials | Major | Major adverse, Short term, reversible |
| | | Leak or breakage of the temporary sewerage system | Major | Major adverse, Short term, reversible |
| Water supply | Moderate | Increased water demand | Minor | Minor adverse, Short term, reversible |
| Surface water drainage capacity | Moderate | Dewatering of excavations | Medium | Moderate adverse, Short term, reversible |
| Site users: Human health and safety, construction workers and plant | High | Flood risks to site workers (surface water and fluvial from River Avon) | Minor | Moderate adverse, Short term, reversible |

## Operational Effects

## Relevant aspects of the Proposed Development and designed-in mitigation

8.149. The following commitments, made through the FRA (Appendix 8.1) and drainage strategy (Appendix 8.2), are considered to form designed in mitigation for the Proposed Development.

### Surface Water Drainage

8.150. The drainage strategy includes the detailed proposals for surface water drainage and associated demands from the Proposed Development. A summary of the proposal is provided here.

8.151. As there will be an increase in positively drained impermeable area within the site, there will be an increase in the likelihood and magnitude of standing water and surface water runoff occurring. The surface water strategy below has been devised to mitigate this and provide betterment to the existing surface water flows discharging from the site.

8.152. SuDS will be implemented within this development scheme. The conceptual SuDS strategy for the proposed development has been derived using the principles outlined within the CIRIA C753 SuDS Design Manual along with BS 8582:2013 – Code of Practise for Surface Water management for Development Sites.

8.153. The scheme will utilise the existing topography and natural drainage catchments. Minor re-profiling of the site is proposed to direct surface water runoff away from proposed structures. However, it is expected that resultant flood flow paths will replicate the existing and direct flows flow paths onto Alan Turing Way to the east and the stadium raceway to the south.

8.154. The anticipated impermeable area of the catchment is based upon all redeveloped areas being utilised as hardstanding. With limited possibility of further hardstanding being implemented no allowance has been made for urban creep.

8.155. The proposed piped drainage system should be designed such that there is no surcharging in the 1 in 2-year probability event, and no flooding in the 1 in 30-year probability event. The piped system should be designed to Building Regulations Part H standards.

8.156. The surface water drainage strategy will comprise of a traditional gravity drainage network sized to convey flows from hardstanding areas and buildings to a geocellular storage tank, located in the northern area of the City Square, prior to being discharged offsite at an agreed allowable discharge rate. Pipe gradients are set to achieve the self-cleansing velocity of 1m/s.

8.157. Porous paving will be used within the south of the site adjacent to the proposed north stand to provide attenuation and to delay and mitigate the peak flood flows from the site. The porous paving will be supplemented with linear drainage and/or gullies to ensure all runoff is captured within the site boundary. The hardstanding will slope towards the linear drains with gullies located at low points where required.

8.158. The commercial roof, hotel roof and expanded north stand roof will discharge via multiple rain water pipes (RWPs). These RWPs will connect into the proposed gravity drainage network and be conveyed to the attenuation tank.

8.159. The drainage of the existing stadium roof retains the status quo as it drains into the existing drainage infrastructure within the Etihad Campus. The development of the site will not impact the discharge of the existing roof.

8.160. The hotel drop off will drain into the into a bioretention system within the adjacent green areas. The stadium raceway will be drained via permeable paving where possible. Where it is not possible to drain the onsite highways via SuDS gullies and channel drains will be used to convey water directly into the gravity drainage network. It is envisaged a petrol interceptor will also be required as due to proposed levels and site constraints it will not be possible to treat all areas of the site SuDS.

8.161. The geocellular tank is sized based on 95% porosity and is designed to accommodate rainfall events up to and including the critical 1 in 100 year plus 45% allowance for climate change rainfall event (see Table 3-2for required attenuation volumes). Hydraulic Calculations are available in Appendix E.

8.162. The surface water will discharge to an existing private manhole in the north of the site at a rate of 38.2l/s before being conveyed through the private network into a UU surface water sewer.

8.163. An overview of the attenuation volumes of the Surface Water Drainage Strategy can be seen in Table 8.7.

Table 8.7 Attenuation volumes from Drainage Strategy (Appendix 8.2)

| | Catchment Area (ha) | Proposed Peak Discharge Rates (l/s) | Approximate total storage volume ($m^3$) | Void Ration |
|---|---|---|---|---|
| Etihad North Stand Development | 2.480 | 38.2 | 1440 | 0.95 |

### Foul Water Drainage

8.164. The foul water drainage strategy will comprise a traditional gravity drainage network sized to convey flows from connection points within the hotel building, commercial building and expanded North Stand to private onsite sewer. The existing private foul water network has been diverted as part of the site improvement works undertaken onsite but maintains its connection to the UU network in the north of the site at MH 7701.

8.165. Calculations in the drainage strategy (Appendix 8.2) are considered industry standard. However, for this development it can be reasonably assumed that the individual buildings will not be concurrently discharging at peak flow. UU have agreed to accept flows from the site at an unrestricted rate to their network.

## Potential Effects of the Proposed Development and their Significance

8.166. This section considers the potential effects that the Proposed Development will have on the water environment once operational.

8.167. The effects of the Proposed Development on the water environment during operation include:

- Pollutants contained within surface water run-off contaminating water bodies through overflow/leaks to the sewer system;
- Water services infrastructure may not be able to maintain the increased water demand; and
- Sewerage infrastructure may not have enough capacity to receive foul discharges to the network and wastewater treatment works.

### Pollutants Contained in Surface Water

8.168. Pollutants, such as silts and hydrocarbons resulting from activities on-site such as vehicle storage, vehicle washing, and oil/fuel leaks would be discharged to the public surface sewerage network through surface water run-off. This can increase water turbidity, deplete oxygen levels and be toxic to the aquatic environment.

8.169. It is considered that the onsite hotel drop off and the stadium raceway will each individually have less than 300 traffic movements per day. Each of the identified pollutants in the drainage strategy (appendix 8.2) are beyond the level of pollutants expected from the proposed usage. Therefore, the use of bioretention system and permeable paving will provide an adequate level of pre-treatment for the site where it can be applied.

8.170. The magnitude of change will depend on the activities present and their occurrence. The effect is considered permanent (as an ongoing effect), although certain activities such as accidental spillages would be temporary. The flow rate associated with the Proposed Development is to be an improvement on the current flow rate associated with the Site. It is envisaged that the magnitude of operational effects on the River Medlock and Ashton Canal will be negligible due to the commitments made in the Drainage Strategy. Therefore, the overall significance of the effect upon water quality is negligible.

### Potable Water Demand

8.171. Due to the scale of the Proposed Development, the water demand once complete and operational will increase from the baseline. Estimating the water demand is difficult due to the varying water demands of activities. The number of people using the Site is anticipated to fluctuate depending on whether a match is taking place.

8.172. The Proposed Development will increase demand for water supply when compared to the baseline. In the context of moderate sensitivity water resource within the area, the magnitude of change is moderate adverse and significance of effect upon strategic water supply is considered to be moderate adverse without further mitigation.

### Foul Water Drainage Capacity

8.173. The network will comprise a traditional gravity drainage network sized to convey flows from connection points within the hotel building, commercial building and expanded North Stand to a private onsite sewer. This existing private foul water network has been diverted as part of the site improvement works undertaken onsite but maintains its connection to the UU network in the north of the site at MH 7701. For calculations and further detail please see drainage strategy (Appendix 8.2).

8.174. The total peak foul discharge rate is calculated to be 45.07l/s. UU have agreed to accept flows from the site at an unrestricted rate to their network (see Appendix 8.2 for correspondence).

8.175. The sensitivity of the receptor is seemed to be moderate. The magnitude of change is deemed to be moderate adverse therefore, the significance of effect is deemed to be moderate adverse.

### Changes to flood risk

8.176. The Site is considered to be within flood zone 1; therefore, is already considered to be at low risk of fluvial flooding. The measures proposed in the drainage strategy will mitigate surface water flood risk on-site. The sensitivity of the receptor is deemed to be high; however, the magnitude of change is deemed to be negligible. Therefore, the significance of effects is deemed to be negligible.

## Climate change and adaptation

8.177. The Proposed Development is expected to be completed and fully operational by 2026. Climate forecasts looking beyond this time predict that by the 2080s, the north-west of England will likely experience approximately 30% more precipitation during the winter and 30% less precipitation during summers. The increase in precipitation during winter will increase the risk of flooding from overflowing storm water sewers, particularly during heavy rainfall events which could cause flash flooding. The Proposed Development is already well safeguarded against flood events and the mitigation measures mentioned will decrease the risk further. Planned sewerage infrastructure for rainwater drainage should have a capacity sufficient to manage the increased capacity forecast later in the century.

8.178. The stormwater network will ensure no flooding in the 1 in 100-year rainfall event. The site is modelled using FEH13 rainfall data.

8.179. In accordance with the Irwell Management Catchment peak rainfall allowance, for a 1% annual exceedance event, an uplift in rainfall intensity of 45% is proposed to account for the future effects of climate change across the lifespan of the development.

## Summary of effects

8.180. A summary of potential operational effects and their significance prior to further mitigation is provided in Table 8.8.

Table 8.8 Summary of potential effects during operation

| Receptor | Sensitivity | Description of change/effects | Magnitude of change/effects | Effect significance |
|---|---|---|---|---|
| River Medlock; Water quality | High | Pollutants contained in surface water | Negligible | Negligible, Long term, reversible |
| Ashton Canal; Water quality | High | Pollutants contained in surface water | Negligible | Negligible. Long term, reversible |
| Water supply | Moderate | Potable water demand: Increased | Moderate | Moderate Adverse, Long term, irreversible |
| Foul drainage capacity | Moderate | Foul water drainage: Increased | Moderate | Moderate Adverse, Long term, irreversible |
| Site users: Human health and safety | High | Changes to flood risk: Flood risk to humans/uses vulnerable to flood risk | Negligible | Negligible, Long term, reversible |

## 2014 Extant Consent

8.181. The 2014 extant consent does not include a water resources and flood risk ES chapter. However, during both the construction and operation phases, the effects associated with the 2014 consent are likely to be similar to those set out for the Proposed Development, due to the similar nature and scale of development. Similar mitigation measures would be implemented for the 2014 consent as the Proposed Development, including a Construction Management Plan and measures set out in the FRA and Surface Water Drainage Strategy.

## Mitigation Measures

### Construction

#### Supplementary mitigation measures during construction

8.182. The Principal Contractor will develop a Construction Management Plan (CMP) to cover the construction works. It will include mitigation measures to protect the water environment.

8.183. This will set out how construction activities will be undertaken in accordance with good practice guidance, including the PPG formerly published by the EA, particularly:

- 'PPG1: General guide to the prevention of water pollution'
- 'PPG2: Above ground oil storage tanks'
- PPG5: Works in, near or liable to affect watercourses'
- 'PPG6: Working at construction and demolition sites', and other good construction guidance such as CIRIA 'Guidance C532 – Control of water pollution from construction sites'

8.184. Once the supplementary mitigation measures are implemented, along with good site practices, the residual construction impacts to the water environment are considered to be negligible and temporary for the duration of the construction period.

8.185. A summary of the mitigation measures proposed to reduce the adverse effects of construction on the water and flood risk at the Site can be found in Table 8.9.

Table 8.9 Supplementary mitigation measures for construction phase

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Elevated sediment loads in surface water | Development and implementation of a CMP that considers the following measures:<br>• Minimise exposed surface areas by only removing vegetation and hard standing when necessary and keep gradients of soil as shallow as possible to prevent large amounts of earth being washed away during periods of heavy rainfall. Areas which are exposed should be reseeded or surfaced as soon as practicable.<br>• Enforce tight control of site boundaries including minimal land clearance and restrictions on the use of machinery adjacent to water bodies. Where possible, do not locate stockpiles within 10m of water bodies or drainage lines.<br>• Wheel wash facilities should be provided at all entry and exits points. Water from wheel wash facilities must not be discharged into water bodies or the on-site surface water sewerage network.<br>• Capture run off from site in perimeter cut off ditches, settlement lagoons and/or settlement tanks where possible.<br>• Sediment should be removed from water pumped during any extractions required. Sediment should be removed prior to discharges to the surface water network through the use of a baffle tank system or equivalent.<br>• If there is a requirement for discharge to the sewer system, this should be throttled to a flow rate that is agreed with UU prior to commencement of work. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Accidental release of hydrocarbons and oils | Development and implementation of a CMP that considers the following measures:<br>Incorporation of interceptors where appropriate into the Site drainage system at high risk areas, such as parking, unloading and refuelling areas, to remove hydrocarbons and oils from surface water prior to discharge.<br>Other measures including drip trays under equipment such as generators, and wheel washing facilities should also be implemented to minimise the risk of pollutants infiltrating groundwater or the surface water drainage network. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |
| Accidental leaks and spillages of significant amounts of hazardous materials | Development and implementation of a CMP that considers the following measures:<br>Implement measures to minimise infiltration.<br>Provision of storage facilities and tanks and conduct refuelling of machinery within bunded areas, which should not be located within 10m of water bodies or drainage lines.<br>Storage and bunded areas to be constructed of impervious floors and walls with the capacity for the contents of the storage tank and an additional ten per cent safety margin.<br>As a remedial measure, spill containment equipment such as absorbent materials should be stored on-site.<br>Mixing of construction materials, such as cement, will be conducted in designated areas located away from drainage lines. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |
| Dust and debris blowing into water bodies | CMP to include dust suppression measures such as dampening, and wheel washing.<br>Implement good site practice, perimeter fences and tight control of materials and waste to minimise the risk of debris entering water bodies. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |
| Dewatering of excavations | Capture run off from site in perimeter cut off ditches, settlement lagoons and/or settlement tanks where possible.<br>Sediment should be removed from water during any extractions required.<br>Sediment should be removed prior to discharges to the surface water network or on-site ponds through the use of a baffle tank system or equivalent.<br>If there is a requirement for discharge to the foul sewer, this should be throttled to a flow rate that is agreed UU prior to commencing works. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Flood risk to site workers (human health and safety) and downstream areas during construction | Contractor to prepare a flood emergency and contingency plan including arrangements to make safe any static plant, move any mobile plant, and to evacuate site operatives in a flood risk emergency.<br>Construction workers should be made aware of risks associated with excess surface water caused by overland flows and standing water. For example, risks to deep excavations and damage to plant.<br>To minimise any potential risk from groundwater flooding during excavation of the Site, cut levels should be limited to at least 0.5m above the groundwater level. Where this is not possible, dewatering and other groundwater control measures should be employed. Any such groundwater control measures will also require pollution control measures in accordance with EA guidance. | CMP to be secured through planning condition and implemented by contractor. | Prior to and during construction |

### Operational

8.186. Supplementary mitigation issues identified during operation are detailed in Table 8.10.

Table 8.10 Supplementary mitigation measures for operational phase

| Adverse effect | Mitigation measure | Responsibility/Mechanism for implementation | Timing |
|---|---|---|---|
| Water demand and foul water drainage | Early engagement with UU on the potable water needs for the Proposed Development, and any current restrictions and the need for any upgrades.<br>Water efficiency measures that will reduce potable demand and subsequent foul flows including one or more of the following:<br>Low flow fittings: low flush toilets, spray taps and low flow showers, if necessary<br>Efficient water supply: leak detection, smart meters and pressure reduction<br>The advantage of demand management is not only for reducing supply, but also for minimising the volume of the foul drainage element to the combined sewer. | Through the development of a potable water and foul water strategy between now and construction of the Proposed Development. | Strategies to be completed during detailed design stage. |

## Cumulative Effects

8.187. This section presents the assessment of cumulative effects from the Proposed Development in combination with other nearby schemes.

8.188. Possible cumulative effects include demand on the potable and foul water networks, flood risk and changes in water quality downstream. All the developments listed will have the potential to contribute towards a cumulative effect with the Proposed Development.

### Construction effects

8.189. Where there is overlap between the construction programme for the Proposed Development and the cumulative schemes, there will be potential for cumulative effects with regards to pollution and sediment loading within the nearby waterbodies - River Medlock and Ashton Canal – affecting the water quality through runoff from the Site.

8.190. However, this is not expected to be significant with compliance and implementation of mitigation measures (i.e., development of CMP). It is assumed that the cumulative schemes will put in place similar mitigation measures to the Proposed Development and comply with regional and national guidance.

8.191. Given the location of the cumulative schemes, they have potential to increase the risk of pollutant loading in the river due to cumulative discharge of surface water. However, through the implementation of the Construction Management Plan, the cumulative schemes are unlikely to increase the risk of pollutant loading in the River Medlock and the Ashton Canal.

8.192. Therefore, potential cumulative effects at the construction phase are considered to be not significant.

### Operational effects

8.193. As is the case with the Proposed Development, the cumulative schemes are likely to discharge surface water into the River Medlock, and potentially the Ashton Canal, via sewers. Through a number of measures recommended in the Drainage Strategy and Flood Risk Assessment, and assuming that other schemes implement similar flood risk and pollution prevention measures in line with planning policy requirements, it can be assumed that flood risk will be managed through design-in measures.

8.194. The cumulative schemes around the Site may impact on the capacity of the existing water supply network. It may also be assumed that any cumulative schemes will put increased stress water supply for the area. However, it is assumed that cumulative schemes will implement appropriate water efficiency measures and will have dialogue with UU to ensure that effects are non-significant.

8.195. Potential cumulative effects at the operational phase are therefore considered to be not significant.

## Residual Effects

8.196. If the further mitigation measures outlined in this chapter and good site practice is carried out, then residual construction effects on the water environment are considered to be negligible to minor adverse (and temporary) for the duration of the construction period.

8.197. Additionally, if the measures outlined in the flood risk assessment and drainage strategy are included, then residual effects during operation are likely to be negligible.

8.198. A summary of all residual adverse or beneficial effects are detailed in Table 8.11.

Table 8.11 – Summary of Receptors, likely significant effects, mitigation measures and residual effects.

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| River Medlock: water quality | Increased sediment load; Hydrocarbon and oils; Accidental leak of and use of hazardous materials; Leak or breakage of the temporary; and sewerage system. | Measures implemented through a CMP | Negligible |
| Ashton Canal: water quality | Increased sediment loads; Hydrocarbon and oils; Accidental release of hazardous materials; Dust and debris; and Leak or breakage of the temporary sewerage system. | Measures implemented through a CMP | Negligible |
| Water supply | Increased water demand | N/A | Minor adverse |
| Surface water drainage capacity | Dewatering of excavations | Measures implemented through a CMP | Negligible |
| Site users: Human health and safety, construction workers and plant | Flood risks to site workers (surface water and fluvial from River Avon) | Measures implemented through a CMP | Negligible |
| **Operational** | | | |
| River Medlock; Water quality | Pollutants contained in surface water | N/A | Negligible |
| Ashton Canal; Water quality | Pollutants contained in surface water | N/A | Negligible |
| Water supply | Potable water demand: Increased | • Early engagement with UU on the potable water needs for the Proposed Development, and any current restrictions and the need for any upgrades.<br>• Water efficiency measures that will reduce potable demand and | Minor adverse |
| Foul drainage capacity | Foul water drainage: Increased | | Minor adverse |

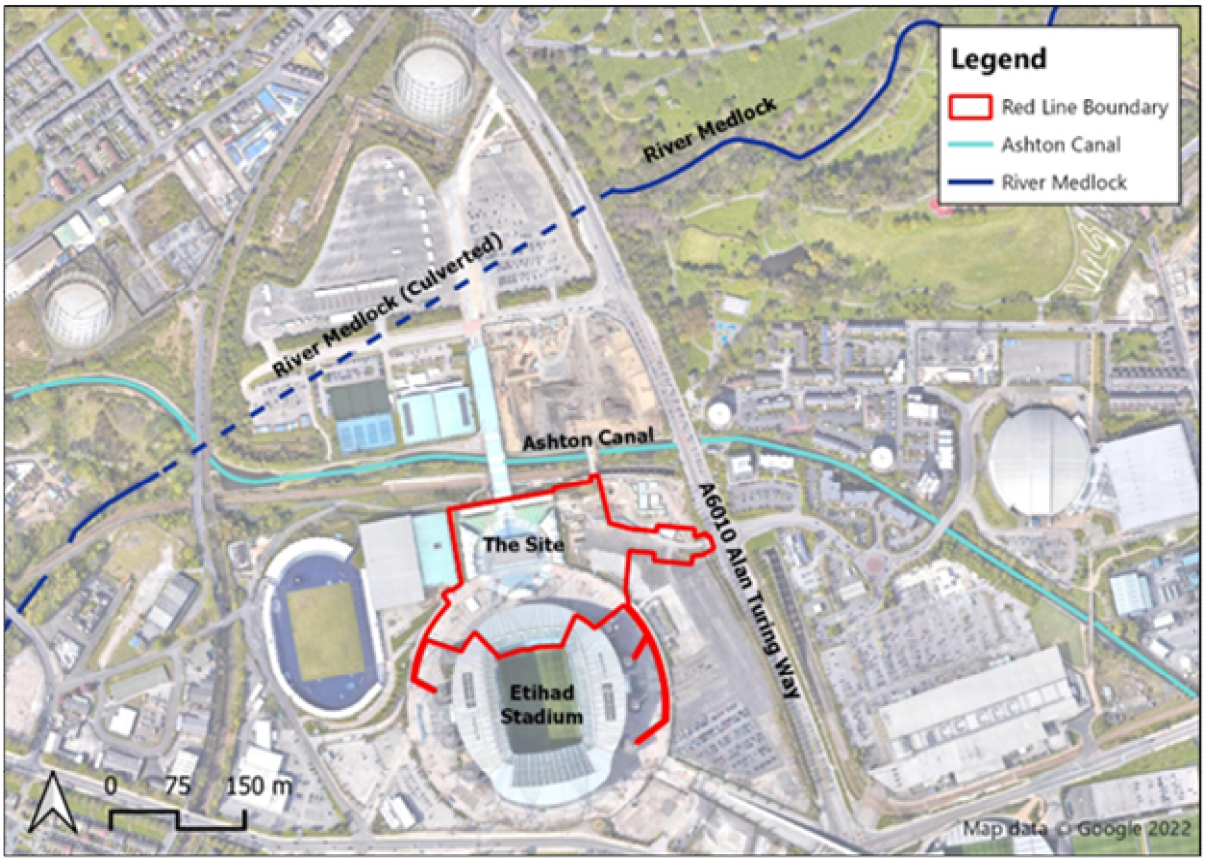
| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | | subsequent foul flows<br>The advantage of demand management is not only for reducing supply, but also for minimising the volume of the foul drainage element to the combined sewer. | |
| Site users: Human health and safety | Changes to flood risk: Flood risk to humans/uses vulnerable to flood risk | N/A | Negligible |

## Reference List

8.199. This ES Chapter has been prepared by reference to the following:

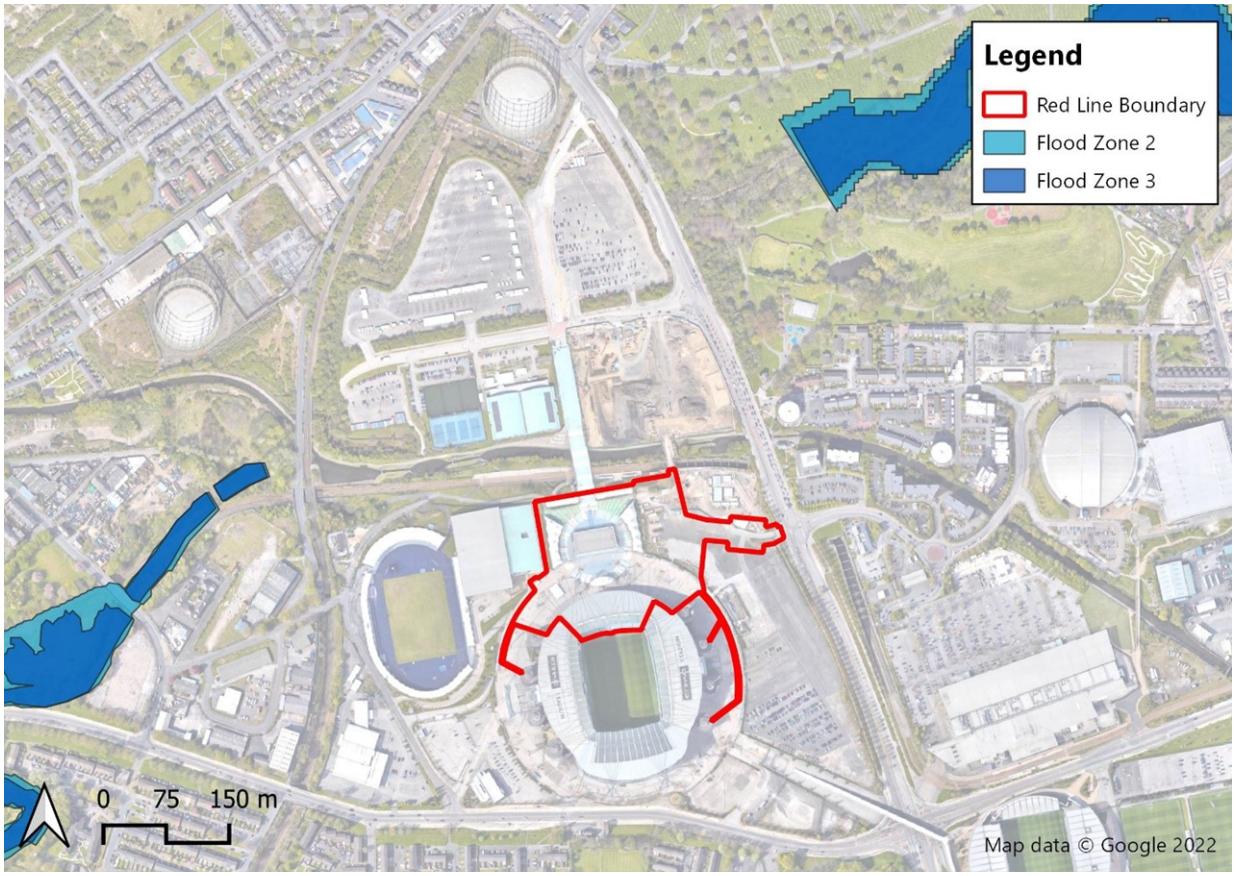

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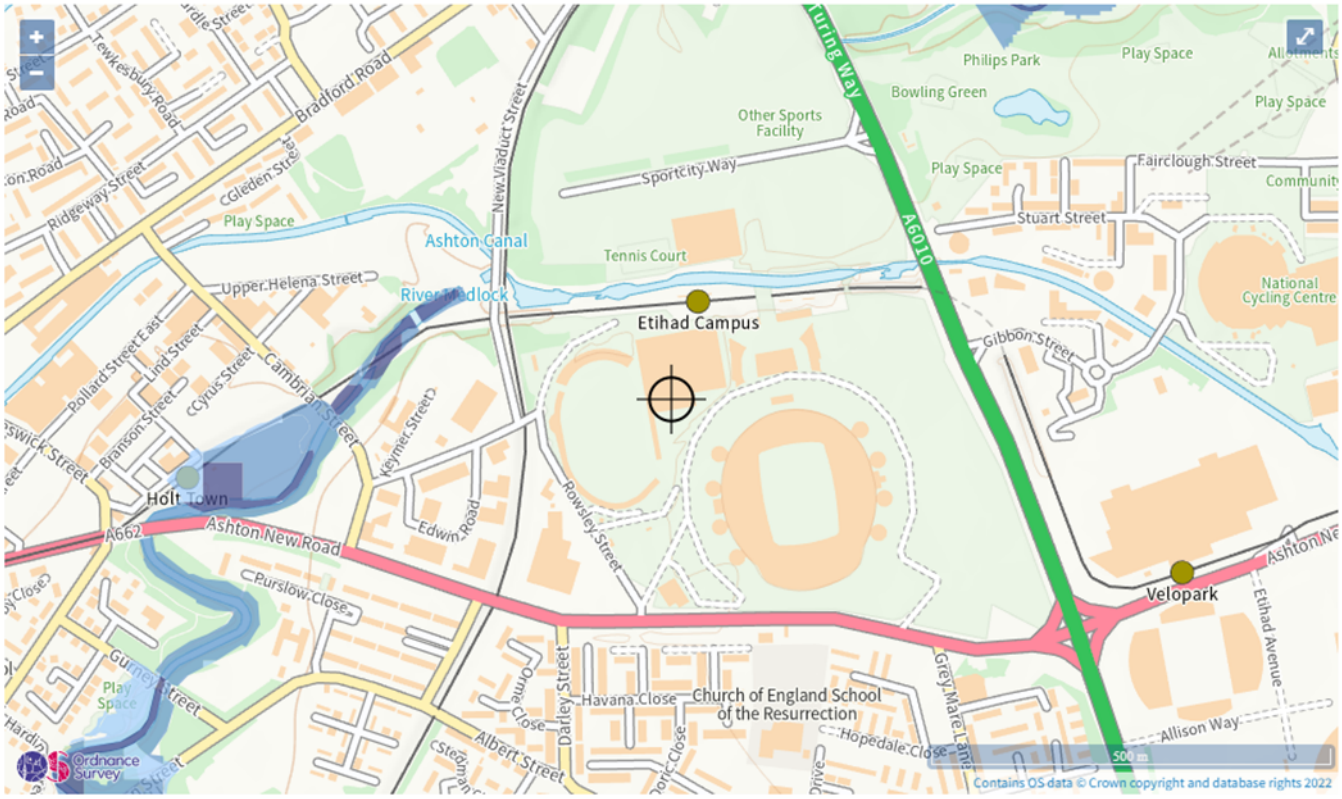

| | | |
|---|---|---|
| | **Figure:** | **8.1** |
| | **Title:** | **The Site with red line boundary and key surrounding features** |
| | **Project:** | **North Stand, Manchester** |

| | | | | |
|---|---|---|---|---|
| | **Date:** | **April 2023** | **Scale:** | **Scale /NTS** |




| | | |
|---|---|---|
| | **Figure:** | **8.2** |
| | **Title:** | **EA flood zone map, showing that The Site is located entirely within Flood Zone 1** |
| | **Project:** | **North Stand, Manchester** |

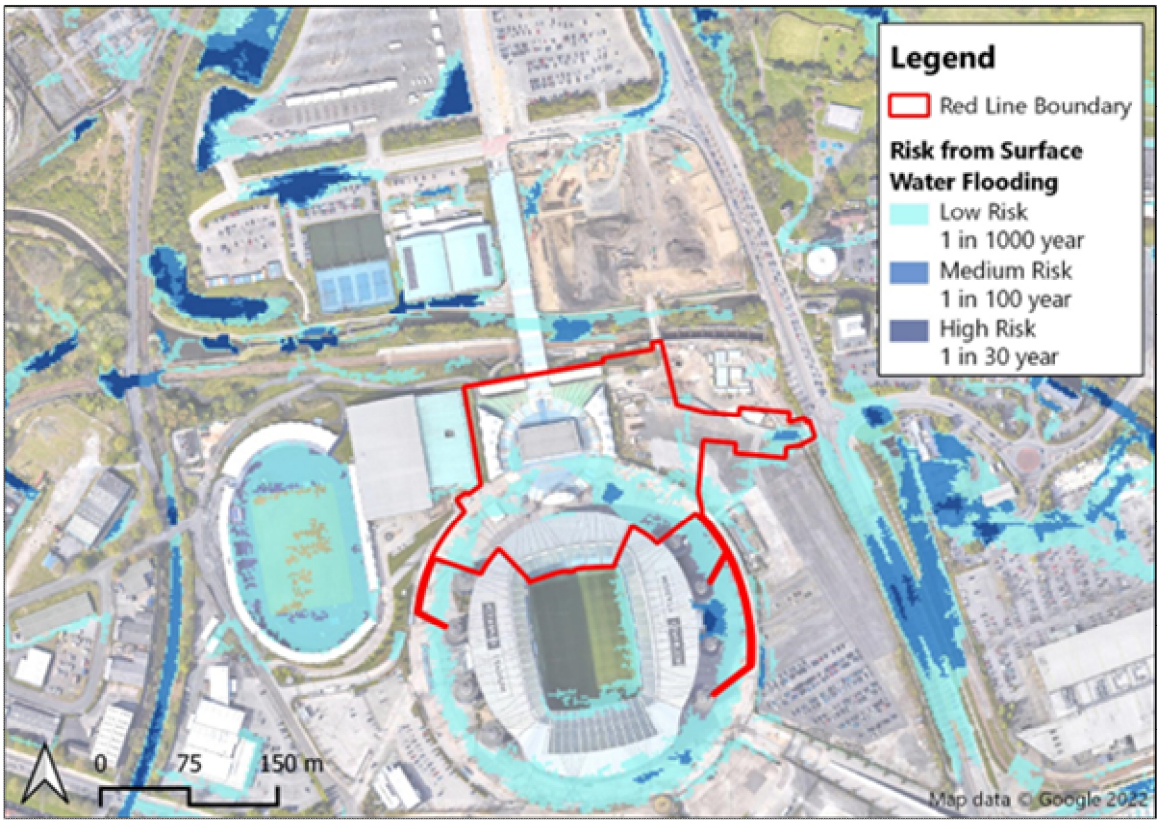
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|---|---|---|---|---|
| | **Date:** | **April 2023** | **Scale:** | **Scale /NTS** |




Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **8.3** | | |
| | **Title:** | **Extent of flooding from rivers of the sea** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **April 2023** | **Scale:** | **Scale /NTS** |




| | | |
|---|---|---|
| | **Figure:** | **8.4** |
| | **Title:** | **EA risk of flooding from surface water** |
| | **Project:** | **North Stand, Manchester** |

| | | | | |
|---|---|---|---|---|
| | **Date:** | **April 2023** | **Scale:** | **Scale /NTS** |

# 9. Ground Conditions

## Introduction

9.1. This Chapter of the ES has been prepared by Buro Happold and assesses the likely ground conditions' impacts of the proposals upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

9.2. This Chapter is accompanied by three technical appendices, a Desk Study Report (Appendix 9.1), a Coal Mining Risk Assessment (Appendix 9.2) and a Generic Quantitative Risk Assessment (GQRA) (Appendix 9.3).

| Technical Competence in Ground Conditions and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Francesca Gould | Hugh Mallett |
| Company | Buro Happold | Buro Happold |
| Qualifications/Accreditations relevant to technical area | BSc (Hons) in Geology<br><br>Fellow of the Geological Society (FGS) | BSc (Hons) Geology<br><br>MSc Engineering Geology<br><br>Chartered Geologist (C.Geol)<br><br>Specialist in Land Condition (SiLC) |
| Does the practitioner hold any IEMA qualification? | No | No |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 8 years | 45 years |
| Number of EIA's delivered to date | 10+ | 10+ |

## Legislative and Policy Context

### Legislation

9.3. Land contamination is regulated under several regimes including: environmental protection, pollution prevention and control, waste management, planning and development control and health and safety legislation. The primary regulatory regimes under which contaminated land is managed in the UK are the planning process described in the National Planning Policy Framework (NPPF) (MHCLG, 2021) and associated Land Contamination Risk Management guidance (Environment Agency, 2020) and Part 2A of the Environmental Protection Act 1990 (as amended) (HM Government, 1990). The framework for the assessment of potential land contamination adopted in this assessment is based on current guidance

documents regarding the implementation of these regimes and the assessment of potentially contaminated land, with particular reference to: Land Contamination Risk Management (Environment Agency, 2020) and their Guiding Principles Managing and Reducing Land Contamination, 2010 and the relevant British Standard 10175 (British Standards Institute, 2017)

### National Planning Policy

9.4. Within the NPPF, reference to previously developed land/brownfield land is made within paragraphs 119 & 120, 149(g); 174 e and f. More detailed relevant text is contained within paragraphs 183 and 184.

9.5. The NPPF states that to prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the Site to adverse effects from pollution, should be taken into account. After remediation, the land, as a minimum, should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act (HM Government 1990). There should be adequate site investigation, prepared by a competent person, to inform these assessments. Where a site is affected by contamination, responsibility for securing a safe development, rests with the developer and/or landowner.

### Local Planning Policy

9.6. Manchester's Core Strategy Development Plan Document (DPD) adopted in 2012 is the primary strategic planning document in the City's Local Development Framework. Reference to contaminated land has been made within the Core Strategy, Policy EN 17 Water Quality and Policy EN 18 Contaminated Land and Ground Stability, as follows:

9.7. Policy EN 17 Water Quality: Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses.

9.8. Policy EN 18 Contaminated Land and Ground Stability: The council will give priority for the remediation of contaminated land to strategic locations. Any proposal for development of contaminated land must be accompanied by a health risk assessment. All new development within former mining areas shall undertake an assessment of any associated risk to the Proposed Development and, if necessary incorporate appropriate mitigation measures to address them.

9.9. Policy EN 18 refers to the extensive industrial past particularly in the east of Manchester which has left considerable levels of contamination. Manchester City Council recognise the potential of public safety hazards unless the risks associated with the contamination are fully considered and appropriate treatment/mitigation measures are incorporated within new developments in line with the NPPF.

9.10. The Council's target is for 90% of new development to be on previously developed land. This is in line with historical trends across Manchester and will ensure a sustainable approach is taken with regard to the use of land as a limited resource.

## Assessment Methodology and Significance Criteria

### Assessment Approach

9.11. A conceptual site model of the Site that describes its environmental features, together with the expected interaction of potential contamination sources with the environment, has been developed by undertaking a Source–Pathway–Receptor analysis of the Site in accordance with relevant good practice guidance.

9.12. These terms are defined here:

- Sources: potential or known sources of potential contamination associated with historic or recent/current land uses (e.g. disposal of wastes, spills and leaks);
- Pathways: mechanisms/systems through which exposure of a receptor to a contaminant could occur e.g. direct contact with contaminated soils, migration through air, over land or via permeable ground; and
- Receptors: receptors of varying sensitivity that could be adversely affected by contact (direct or indirect) with a contaminant e.g. residents, workers or visitors on the Site, groundwater and surface water bodies, and ecological resources (flora and fauna).

9.13. Where a source, relevant pathway, and receptor are present, a 'contaminant linkage' is created whereby there is a circumstance through which some level of environmental harm could occur which has to be assessed and mitigated as appropriate.

9.14. The baseline conditions have been assessed for the Site confines and for a distance of up to 250m beyond. This "halo" around the Site boundary is considered in order to take into account the potential for off-site contamination sources and receptors. The baseline data was sourced from a desk based study (Appendix 9.1) of extensive data on the geological and geoenvironmental conditions from existing site investigations and remedial activities, together with published information and existing borehole logs published by the British Geological Survey. This was followed up with a more recent ground investigation which is summarised within the GQRA (Appendix 9.3).

9.15. Committed developments (as set out in ES Chapter 16, Type 1 Cumulative Effects) surrounding the Site are over 500m from the Site; therefore, will not be impacted by the Proposed Development with regard to ground conditions and are not considered further in this chapter.

## Assessment of Effects

9.16. The methodology for impact prediction is based on assessing both the magnitude of change expected and the sensitivity of the receptor. Criteria for assessing the significance of potential human and environmental effects are based on a qualitative assessment of magnitude of the effect (or how far the impact deviates from the baseline condition) and the receptor sensitivity.

9.17. The resources/receptors and the main potential effects outlined in Table 9.1 are considered in the assessment. It is not anticipated that all these resources/receptors will be significantly affected, but it is necessary to demonstrate that these important receptors have been considered.

Table 9.1 - Resources/receptors and potential effects

| Receptor | Effect |
|---|---|
| Investigation and construction workers | Health effects due to the direct or indirect ingestion of contaminated soil and groundwater, dermal contact or inhalation of dusts and/or hazardous fibrous substances or vapours (volatile compounds).<br><br>Exposure to hazardous gases. |
| Visitors and future occupiers | Health effects due to dermal contact with or the direct or indirect ingestion of any residual contaminated soil, inhalation of contaminated dusts and/or hazardous fibrous substances, inhalation of vapours (volatile compounds).<br><br>Exposure to hazardous gases. |

| Receptor | Effect |
|---|---|
| Surrounding land users(neighbours) | Health effects due to inhalation of wind-borne contaminated dusts and/or hazardous fibrous substances (mainly during construction but also in operation).<br><br>Health effects due to inhalation of vapours (volatile compounds) or hazardous gases that migrate via permeable strata and air. |
| Controlled waters (groundwater and surface waters) | Contamination of water resources (Secondary A Aquifer, and River Medlock) by mobile contamination that migrates via run-off or via permeable strata. |
| Ecology | Phytotoxic effects on plant health and growth. Indirect effects on aquatic flora and fauna via contamination of water resources. |
| Built infrastructure | Loss of integrity of below ground concrete, permeation of plastic water supply pipework by direct contact with contaminated soil. |

## Receptor Sensitivity

9.18. The criteria used to assess receptor sensitivity is described in Table 9.2.

Table 9.2 - Criteria for determining receptor sensitivity

| Sensitivity | Examples of receptor |
|---|---|
| **High** | People (on-site or on neighbouring properties) occupying land in residential use with gardens, or using allotments, children's play areas etc.<br><br>Construction workers engaged in extensive earthworks.<br><br>Principal aquifer of regional importance used for potable water supply. Highly ecologically sensitive watercourse or water bodies.<br><br>Nationally or internationally designated ecological sites.<br><br>Buildings of high historic or local importance. |
| **Moderate** | People (on-site or on neighbouring properties) occupying land in residential use without gardens, or using public areas of soft landscaping/open spaces.<br><br>Construction workers engaged in moderate earthworks.<br><br>Secondary aquifer, local watercourse or non-designated water bodies not used for large scale human consumption which can be used for industrial purposes; may be important for local recreational purposes.<br><br>Locally designated ecological sites.<br><br>Buildings, including services and foundations. |

| Sensitivity | Examples of receptor |
|---|---|
| Low | People (on-site or on neighbouring properties) occupying or using commercial or industrial buildings, car parking, hard landscaping.<br><br>Construction workers site but with minimal disturbance to the ground.<br><br>Non-potable water resources, water body of low recreational qualities.<br><br>Sites of low ecological value and flora and fauna occupying non-designated open areas.<br><br>Infrastructure (e.g. roads, highways and railways). |
| Negligible | Land with no access to people and no neighbouring properties.<br><br>Construction workers on-site, but with no disturbance to the ground on site.<br><br>Non-aquifer, no nearby watercourses or water bodies within 1km.<br><br>No sites of significant ecological value and no built development within 1km. |

## Magnitude of change / impact

9.19. The criteria used to assess how far an effect deviates from the baseline condition, i.e. the magnitude of change, are described in Table 9.3. Specific criteria have been adopted as they are more applicable when assessing the magnitude of impact in relation to ground conditions.

Table 9.3 - Criteria for determining magnitude of change

| Magnitude of impact | Criteria for assessing impact |
|---|---|
| Major | Short term (acute) or long term (chronic) adverse effects on human health, broadly equivalent to “significant harm” as defined by the Environmental Protection Act 1990 (HM Government, 1990).<br><br>Persistent and extensive pollution of water resource or ecosystem equivalent to Category 1 pollution incident (major pollution release).<br><br>Catastrophic damage to crops/building/infrastructure. |
| Moderate | Short term (acute) or long term (chronic) adverse effects on human health but not equivalent to “significant harm” as defined by the Environmental Protection Act 1990.<br><br>Non-persistent pollution of water resource or ecosystem equivalent to Category 2 pollution incident (moderate pollution release).<br><br>Significant damage to crops/buildings/infrastructure (on or off-site).<br><br>Contamination of off-site soils. |

| Magnitude of impact | Criteria for assessing impact |
|---|---|
| Minor | Easily preventable, non-permanent health effects on humans.<br><br>Minor, low-level, localised, temporary pollution of water resources or ecosystem.<br><br>Easily repairable damage to crops/buildings/infrastructure.<br><br>Easily preventable, permanent health effects on humans.<br><br>Localised damage to buildings/infrastructure (on or off-site). |
| Negligible | No discernible adverse effects. |

## Significance Evaluation

9.20. The significance of a potential effect is derived by considering both the sensitivity of the feature and the magnitude of change, as demonstrated in Table 9.4.

Table 9.4 - Matrix for determining effect significance

| | Sensitivity | | | |
|---|---|---|---|---|
| Magnitude | High | Moderate | Low | Negligible |
| Major | Major Adverse/Beneficial | Major Adverse/Beneficial | Moderate/Minor Adverse/Beneficial | Negligible |
| Moderate | Major Adverse/Beneficial | Moderate Adverse/Beneficial | Minor Adverse/Beneficial | Negligible |
| Minor | Moderate/Minor Adverse/Beneficial | Minor Adverse/Beneficial | Minor Adverse/Beneficial | Negligible |
| Negligible | Negligible | Negligible | Negligible | Negligible |

9.21. Note that moderate and major effects are considered to be 'significant'. Those which are minor to moderate may be considered significant, based on a judgement made by the assessor in particular circumstances.

9.22. Effects can also be described, for example as:

- Beneficial or adverse;
- Permanent or reversible; and
- Short, medium or long term.

## Limitations and Assumptions

9.23. Beneficial or adverse effects to the relevant receptors during construction and operation are identified and assessed. Beneficial (or positive) effects are associated with the mitigation of risks associated with contamination (e.g. as a result of the breaking of a pollutant linkage). The adverse (or negative) effects

are temporary during the construction phase and relate to the increased potential for contaminant exposure (e.g. from the generation of contaminated dusts), and are long-term from the use of the Site during the operational phase (e.g. associated with any residual contamination).

9.24. The significance of an effect also reflects the timescales involved, i.e. short-term (less than 3 years duration), medium-term (between 3 and 10 years duration) or long term (in excess of 10 years duration), the extent of the area affected and the nature of the effect (i.e. its permanency). The significance of a potential effect is derived by considering both sensitivity of the receptor and the magnitude of impact, as set out in Table 9.3.

9.25. Effects that are generated as a result of the enabling and construction works (i.e. those that last for this set period of time) are classed as 'temporary'. These may be further classified as either 'short term' or 'medium-term' effects depending on the duration of the enabling and construction works that generate the effect in question. Effects that result from the completed and operational Proposed Development are classed as 'permanent' or 'long-term' effects.

## Baseline Conditions

9.26. An initial understanding of the baseline has been obtained from a review of published mapping, existing reports on the Site and neighbouring land, and the recent ground investigation completed by Geotechnical Engineering Ltd in 2023.

9.27. The natural geology beneath the Site comprises Carboniferous Pennine Upper Coal Measures (at about +45mOD), overlain by approximately 11m of Glacial Till. Overlying these natural strata, Made Ground (fill) was encountered to varying depths, ranging between 3m and 8m below ground level.

9.28. The Coal Measures are classified as a Secondary A Aquifer, defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers. Groundwater monitoring was carried out as part of the ground investigation. Monitoring began during the investigation upon completion of the installation and then continued as part of a six-week monitoring programme. Groundwater levels within the Coal Measures ranged between +37.7mOD and +42.0mOD. Direction of groundwater flow is considered to be west / southwest following the direction of the River Medlock. Data obtained from the ground investigation does not present any obvious groundwater flow direction though slightly lower levels in the groundwater monitoring were recorded to the east of the Site. There are no groundwater abstractions located within 500m.

9.29. Ashton Canal is located to the north of the Site (35m north), beyond the Metrolink cutting. The Canal climbs for 10.8km through 18 locks toward Ashton-under-Lyne. Lock No. 9 is located nearest to the Site, resulting in a 3.5m ground level change. To the east side of Lock No. 9 the level is at approximately +60.4mOD and to the west of the lock (north of the Site) the ground drops to +56.7mOD. The topographical surveys suggests the water level in the canal (nearest to the Site) to be at about +55.7mOD. The Metrolink cutting is at about +53.8mOD, deeper than the canal by some 2m. The Canal will be lined and is likely to be situated within the Glacial Till deposits.

9.30. The River Medlock at its nearest point is located approximately 160m northwest within a brick-built culvert. The nearest point outside of the culvert is >300m west. Currently the river sits at approximately +35mOD to +36mOD (data obtained by the Environment Agency over the last 12 months) though the highest recorded level has been +39mOD (level recorded in 2019). The flow direction is south-west toward the River Irwell in Manchester City Centre.

9.31. The Site history has been determined with reference to published Ordnance Survey mapping (dating back to the mid-1800s) and to other accessible information and reports (via internet searches). The recent and historic uses of the land at the Site (summarised below) are relevant to the likely location, nature and scale of any ground contamination.

9.32. From the 1840s the Site was shown as fields crossed by several tracks all leading to a structure (use unknown) in the northeast. Part of the Site (southwest) was occupied by the Manchester and Salford Water Works Reservoir. By the 1890s, significant industrial development had taken place across the Site, including the Bradford Iron Works and associated rail infrastructure. By 1905 a gas works had been developed to the north. Between the 1930s and 1950s there were no significant changes to the Site, but some redevelopment occurred in the 1960s from residential to industrial (works). In the 1980s the northern area was cleared of buildings and the Iron Works closed in 1986. The Site was almost completely cleared by the 1990s and a stadium constructed (for the Commonwealth Games) in the early 2000s with subsequent re-purposing for Manchester City Football Club.

9.33. The recent ground investigation encountered hardstanding underlain by 0.4m of concrete and limestone gravel (Type 1) followed by Made Ground / fill (silty sandy gravel or a sandy gravelly clay) with gravel fragments of concrete, brick, clinker, sandstone, limestone, quartz and rare glass. Occasionally strong hydrocarbon odours were observed. No concentrations of inorganic / organic determinands above commercial / industrial thresholds were identified. Occasional samples recorded concentrations of some inorganic determinands (lead and arsenic) above residential thresholds. Approximately half of the samples included elevated concentrations of some Poly Aromatic Hydrocarbons (PAHs) above residential thresholds. Approximately 30% of the samples included concentrations of Total Petroleum Hydrocarbons (TPHs) above residential threshold (but speciated fractions all below individual thresholds). Suspected asbestos containing materials were not observed during the investigation, but chrysotile and amosite were identified under microscope in the laboratory (approximately 16% of samples). A third of samples recorded concentrations below the limit of quantification (<0.001%). Two thirds of samples recorded concentrations above the limit of quantification but below the hazardous waste threshold (0.1%).

9.34. The ground gas regime has been assessed as Characteristic Situation 1. This is consistent with the assessment completed in 2014. Therefore, no mitigation is required to protect new buildings against potentially hazardous ground gas.

9.35. A detailed UXO assessment was completed for the Site (by 6 Alpha in 2022) and the risks associated with unexploded ordnance was concluded to be low. Accordingly, no further mitigation measures are required during enabling works and construction.

9.36. Future baseline conditions in terms of ground conditions are not expected to change significantly if the Proposed Development did not come forward.

9.37. By considering the baseline conditions (outlined above) and proposed future use, a number of potential receptors with respect to land contamination at the Site have been identified. These are listed below:

- Future site users;
- Off-site occupiers/visitors of neighbouring land;
- Construction and site investigation workers;
- Secondary A Aquifer (Coal Measures);
- River Medlock;
- Ashton Canal;
- Ecological receptors (flora);
- Potable water supply pipework; and
- Building structures (concrete).

## Identification and Evaluation of Significant Effects

### Not Significant Construction Effects

9.38. The following construction effects were considered to be not significant (i.e. are all considered to be negligible or minor adverse effects) and as a result were scoped out of further assessment in the EIA Scoping report. The justifications for these effects being not significant are provided in the text below:

Effects on flora (root uptake from contaminated Made Ground materials)

- Existing landscaping on the Site is limited, and any proposed landscaping is likely to be isolated from existing Made Ground materials within raised planters. During the recent ground investigation materials within the Made ground were analysed for phytotoxic elements (copper, nickel and zinc). All samples recorded concentrations of nickel, and the majority of samples recorded concentrations of copper, below relevant thresholds. Three quarters of the samples tested recorded concentrations of zinc below the relevant threshold, but the remaining quarter recorded concentrations above that threshold. Secondary mitigation will include an appropriate thickness of suitable subsoils and topsoils, and all landscaped areas (on residual ground or in landscaped planters) will be completed with imported topsoils. The flora is thus isolated from any residual contaminated Made Ground soils. The imported soils will comply with the relevant British Standard (British Standards Institute 2015) and meet horticultural requirements. Flora is low sensitivity, the magnitude of change is negligible, resulting in an effect significance of negligible beneficial.

Degradation of water quality (Secondary A Aquifer)

- During construction of the Proposed Development, there is a potential for the mobilisation of contamination where sealed surfaces/hardstanding are removed. The Secondary A Aquifer, present within the Coal Measures, is covered by some 11m thickness of low permeability Glacial Till which will inhibit downward migration of any near surface mobile contamination. The aquifer is of poor quality resulting from the extensive mining legacy within the area. There are no potable groundwater abstractions within 500m of the Site. Service trenches/shallow foundations are unlikely to penetrate beyond the Glacial Till material. Deep piling presents a potential to create preferential contaminant migration pathways. However, primary mitigation of this potential risk can be achieved through appropriate risk assessment and design in accordance with the relevant Environment Agency advice. The Secondary A Aquifer is of moderate sensitivity, the magnitude of change is minor, resulting in an effect significance of minor adverse.

Degradation of water quality (River Medlock)

- The River Medlock is located over 160m northwest of the Site, within a culvert. The nearest entrance point is greater than 300m west of the Site. Owing to the geological conditions (substantial thickness of low permeability Glacial Till) and distance to the river, the potential for migration of contamination from site to the River is very limited. The River Medlock is of moderate sensitivity, the magnitude of change is minor, resulting in an effect significance of minor adverse.

Degradation of water quality (Ashton Canal)

- The potential for contamination on-site, mobilised during earthworks and construction is considered unlikely to adversely impact upon Ashton Canal owing to the geological conditions, (substantial thickness of low permeability Glacial Till), the distance of travel (some 30m) and the presence of a deep cutting (Metrolink) between the Site and the canal which will act as a hydraulic barrier. The impact to Ashton Canal is therefore considered to be negligible.

### Significant Construction Effects

#### Effects upon construction workers

9.39. Construction workers are likely to be in contact with Made Ground soils and / or contaminated shallow perched groundwater during earthworks and below ground construction activities. Therefore, there is

the potential for human uptake (via ingestion, inhalation and dermal contact) of contaminants. Effects are generally likely to be short term; therefore, the main contaminants of concern are those of potentially acute hazards (e.g. asbestos, carcinogens, etc.).

9.40. The sensitivity of construction workers in these circumstances is moderate. The magnitude of potential impact is moderate resulting in a potential effect of moderate adverse significance prior to mitigation.

### Effects upon surrounding site users and visitors to neighbouring land

9.41. The construction works have the potential to create new airborne pathways for contaminants to migrate to adjacent land (e.g. as wind borne dusts, as detailed in ES Chapter 6, Air Quality). Therefore, there is the potential for human uptake via inhalation of contaminated dusts, although contaminant concentrations will reduce during migration and exposure is likely to be relatively short-term.

9.42. Off-site neighbours and visitors are moderate sensitivity receptors; the magnitude of the potential impact is moderate, resulting in a potential effect of moderate adverse significance prior to mitigation.

### Effects of Climate Change

9.43. There is the potential for changing weather events to affect the Proposed Development. During construction (including earthworks), wetter winters will result in significant rainfall events or flooding that may overwhelm normal site surface water controls and lead to mobilisation of contamination within exposed soils. To mitigate the potential impact of such events, detailed incident management plans, including responses to extreme weather events, should form part of the Construction Management Plan and site management documents led by the appointed contractor.

Table 9.5 – Description of the construction effects for each receptor and the significance

| Receptor | Sensitivity | Description of effect | Magnitude of change / impact | Effect significance | Duration |
|---|---|---|---|---|---|
| Flora | Low | Degradation of existing flora during enabling works and construction.<br><br>Existing landscaping across the Site is limited. | Negligible | Negligible | P, S-T |
| Secondary A Aquifer | Moderate | Degradation of groundwater quality within the aquifer during enabling works and construction.<br><br>Existing quality of aquifer already relatively poor (owing to mining legacy). No nearby potable abstractions of groundwater. | Minor | Minor adverse | T, S-T |
| River Medlock | Moderate | Degradation of water quality within the River Medlock during enabling works and construction.<br><br>Owing to the distance from the Site (>300m) and the geological conditions (substantial thickness of low permeable Glacial Till) migration | Minor | Minor adverse | T, S-T |

| Receptor | Sensitivity | Description of effect | Magnitude of change / impact | Effect significance | Duration |
|---|---|---|---|---|---|
| | | of mobilised contaminants unlikely to reach the River Medlock. | | | |
| Ashton Canal | Moderate | Degradation of water quality within Ashton Canal during enabling works and construction.<br><br>The Metrolink cutting is located between the Site and the Ashton canal and is deeper than the canal. There is no plausible linkage between construction activities and the canal. | Negligible | Negligible | T, S-T |
| Construction workers | Moderate | Potential for exposure to contaminated soils / dusts and contaminated shallow perched water during construction. | Moderate | Moderate adverse | T, S-T |
| Surrounding site users / visitors | Moderate | Potential for exposure to contaminated soils / dusts and contaminated shallow perched water during construction. | Moderate | Moderate adverse | T, S-T |

## Not Significant Operational Effects

9.44. The following operational effects were considered to be not significant (i.e. are all considered to be negligible or minor adverse effects) and as a result were scoped out of further assessment in the EIA Scoping report. The justifications for these effects being not significant are provided in the text below:

Effects on human health (future site users)

- There are potentially adverse health effects to future site users due to dermal contact with or the direct/indirect ingestion of any residual contaminated soil, inhalation of contaminated dust and/or hazardous fibrous substances, ingestion of contaminated water supplies. The Proposed Development is predominantly hardscaping with some areas of soft landscaped areas mostly within above ground planters but also small areas are present on residual ground. All future landscaping will need to meet the appropriate horticultural requirements with suitable thickness of subsoil and topsoil effectively isolating the materials from the underlying Made Ground. The risks to future site users will be mitigated through appropriate design and implemented during construction. The sensitivity of future site users is moderate and the potential magnitude of change is minor resulting in an effect significance of minor beneficial.

Effects on flora (root uptake from contaminated Made Ground materials) –

- The proposed landscaping will be isolated from existing Made Ground materials or located within above ground planters. All future landscaping will need to meet the appropriate horticultural requirements with suitable thickness of subsoil and topsoil effectively isolating the materials from the underlying Made Ground. The sensitivity of flora is low and the magnitude of change is negligible resulting in an effect significance of negligible..

## Significant Operational Effects

### Effects on the built environment

9.45. There is a potential for residual contamination and/or the natural strata to affect the integrity of below ground concrete and/or for any residual contamination to permeate any in ground plastic water supply pipework. An appropriate assessment on the Made Ground has been completed and is summarised within the GQRA (see Technical Appendix 9.3). Where water supply pipework is installed within the Made Ground, appropriate barrier pipes will be required or suitable imported materials surrounding the pipes. The assessment on below ground concrete is currently on-going, the appropriate design class will be outlined within the foundation design and implemented during construction.

9.46. The sensitivity of the built environment is low and the magnitude of the potential impact is moderate, resulting in an effect of minor adverse significance prior to mitigation.

### Effects of Climate Change

9.47. During operation, the majority of the Site will be occupied by either hardstanding or new buildings associated with the Proposed Development. As part of the recent ground investigation a programme of groundwater and ground gas monitoring was undertaken (see Appendix 9.3). The ground gas regime was assessed as Characteristic Situation 1 whereby no further mitigation measures are required to protect against ground gas ingress. Groundwater was monitored within the Coal Measures, with the water table ranging between +37.7mOD and +42.0mOD. This groundwater table is covered by some 11m of low-permeability Glacial Till (clay deposits). Some perched water was encountered within the Made Ground. The effects of wetter winters and drier summers will have limited effects on the ground conditions during operation. Design and implementation of an appropriate Drainage Strategy and Flood Risk Assessment will maximise the resilience of the Proposed Development to the effects of climate change and extreme weather events.

Table 9.6 - Description of the operational effects for each receptor and the significance

| Receptor | Sensitivity | Description of effect | Magnitude of change / impact | Effect significance | Duration |
|---|---|---|---|---|---|
| Future site users | Moderate | Dermal contact / inhalation of contaminated soils. Majority of Site will comprise hard landscaping, effectively encapsulating any contamination within the underlying soils. Appropriate mitigation measures implemented during construction. | Minor | Negligible | P, L-T |
| Flora | Low | Proposed landscaping is likely to be effectively isolated from existing Made Ground materials (horticultural requirements) or located within above ground planters with appropriate imported topsoil. | Negligible | Negligible | P, L-T |
| Built environment | Low | Potential residual contamination within the soils to impact the built environment (permeation of water | Moderate | Minor adverse | P, L-T |

| Receptor | Sensitivity | Description of effect | Magnitude of change / impact | Effect significance | Duration |
|---|---|---|---|---|---|
| | | supply pipework / aggressive attack on below ground concrete) | | | |

## 2014 Extant Consent

9.48. Consent was granted in 2014 for the extension of the North Stand. Based on the recent ground investigation the ground conditions at the Site have not altered significantly since this consent as there have been no substantial development activities in the area with the exception of those works taking place to the northeast associated with the Co-op Arena construction (contractor's temporary offices and facilities). Therefore, all construction and operational effects discussed within this Chapter remain relevant and do not differ from the assessment in 2014 (Buro Happold, 2014) whereby no significant risks were identified.

## Mitigation Measures

9.49. The mitigation measures necessary to mitigate the potential risks previously described (both potentially significant and otherwise) will be set out within the contractors Construction Management Plan (CMP) and the Code of Construction Practice (CoCP). Based on the findings of the ground investigation (refer to GQRA (Technical Appendix 9.3), no formal remediation strategy is required for the Site. However, the activities should be managed appropriately in line with standard good practice.

9.50. A preliminary waste characterisation assessment was completed as part of the GQRA (Technical Appendix 9.3), based on the results of the ground investigation. Almost all materials on site have been classified as potentially Non-Hazardous Waste (92% of dataset). The remaining 8% of samples were assessed as potentially Hazardous Waste due to elevated TPH and zinc oxide. Notwithstanding this preliminary assessment, it is the earthwork contractor's responsibility, in association with the operator and / or owner of the landfill to classify the materials for disposal in line with current guidance. Landfill waste acceptance criteria (WAC), leachate testing and classification prior to disposal to landfill should be undertaken to confirm the waste classification of the natural soils.

9.51. A summary of all the construction mitigation measures that are anticipated to form part of the Proposed Development are shown in Table 9.7.

Table 9.7**Error! No text of specified style in document.** - Summary of anticipated construction mitigation measures

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Direct contact (people) during works | Implementation of appropriate health, safety and hygiene regime (to include PPE and welfare provisions) and good construction practice. | Standard good practice to be implemented by contractor, as outlined within their CMP and CoCP. | Prior to and during construction |
| Dust emissions during construction | Implementation of dust suppression measures (e.g. dampening, wheel washing, site vehicle speed and route control, control of drop height for spoil loading etc). | Standard good practice to be implemented by contractor, as outlined within their CMP and CoCP. | Prior to and during construction |

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Increased infiltration / mobilisation and migration of contamination to neighbouring properties and infrastructure. | Implementation of good construction practice and relevant control measures. | Standard good practice to be implemented by contractor, as outlined within their CMP and CoCP. | Prior to and during construction |

9.52. A summary of the operational mitigation measures that are anticipated to form part of the GQRA (Technical Appendix 9.3) contractors Construction Management Plan and Code of Construction Practice are shown in Table 9.8.:

Table 9.8 - Summary of anticipated operation mitigation measures

| Adverse effect | Mitigation measure | Responsibility/ Mechanism for implementation | Timing |
|---|---|---|---|
| Aggressive attack on below ground concrete | Design to meet requirements of ground conditions and BRE recommendations | Below ground concrete specified in foundation design. | Prior to and during construction |
| Permeation of water supply pipes | Design to meet requirements of ground conditions and recommendations of United Utilities | Assessment described within the GQRA (Appendix 9.3). Appropriate barrier pipes to be implemented where supply pipes are laid in direct contact with Made Ground. | Prior to and during construction |

## Cumulative Effects

9.53. The committed developments within the vicinity of the Proposed Development are over 500m from the Site. They are all consented; therefore, if they go ahead they will be subject to the same legislation and policy as the Proposed Development and will follow standard planning requirements. There are no plausible scenarios where the Proposed Development would affect the surrounding committed developments beyond the assessment presented within this Chapter.

## Residual Effects

9.54. There are limited potential risks to people and the environment associated with the Proposed Development and the ground conditions on-site during the construction phase. Mitigation measures, informed by site investigations (summarised within the GQRA, see Appendix 9.3) and defined by the contractor's Construction Management Plan and method statements will ensure appropriate design and construction during development. On completion of the Proposed Development, all potential operational effects are assessed to be negligible and no supplementary measures are therefore considered necessary.

Table 9.9 - Summary of residual effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| Construction workers | Direct contact (direct and indirect) of contaminated ground. | Implementation of appropriate health, safety and hygiene regime (to include PPE and welfare provisions). Implementation of good construction practice. All detailed in the CoCP and CMP. | Negligible |
| Off-site users/visitors | Inhalation of contaminated dusts | Implementation of good construction practice (dust suppression). All detailed in the CoCP, and CMP. | Negligible |
| Operational | | | |
| Future site users/visitors | Direct contact / ingestion of contaminated soils | Majority of site is hardstanding, with limited areas of soft landscaping. Proposed landscaping is likely to be effectively isolated from existing Made Ground materials (horticultural requirements) or located within above ground planters with appropriate imported topsoil. | Negligible |
| Built environment | Permeation of water supply pipes and aggressive attack on below ground concrete structures | Implementation of appropriate concrete design class during construction (as defined within the foundation design).<br>Implementation of appropriate barrier pipe materials during construction where pipework is placed directly in Made Ground. | Negligible |

## Reference List

9.55. This ES Chapter has been prepared by reference to the following:


- Ministry of Housing, Communities & Local Government (2012); 'Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance'
- Ministry for Environment Food and Rural Affairs (2021); 'National Planning Policy Framework (NPPF)'
- Environment Agency, EA (2020); 'Land Contamination Risk Management (LCRM)'
- Environment Agency, EA (2010); 'Guiding Principles for Land Contamination'
- British Standards, BS (2017); 'BS10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of Practice'

- 6 Alpha Associates Ltd, 6 Alpha (2022); 'Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment'
- Buro Happold Ltd, BH (2013); 'Preliminary Risk Assessment'

# 10.Human Health

## Introduction

10.1 This Chapter of the ES has been prepared by Enfusion and assesses the likely Human Health impacts of the proposals upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

| | Lead Author | Reviewer |
|---|---|---|
| Name | Barbara Carroll | |
| Company | Enfusion | |
| Qualifications/Accreditations relevant to technical area | BSc MSc CEnv FIEMA<br><br>Co-author of The EIA Handbook (3rd edition, 2019, ICE Publishing) | |
| Does the practitioner hold any IEMA qualification? | Yes – Fellow FIEMA | |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 25 years + | |
| Number of EIA's delivered to date | 50+ | |

## Limitations and Assumptions

10.2 This Health Chapter considers the findings relevant to human health of each technical impact assessment scoped into the Environmental Statement – Air Quality (Chapter 6); Climate Change (Chapter 7); Flood Risk & Drainage (Chapter 8); Ground Conditions (Chapter 9); Noise & Vibration (Chapter 11); Townscape & Visual Impact (Chapter 12); Traffic & Transport (Chapter 13); Wind Microclimate (Chapter 14); Lighting (Chapter 15); and Socio-Economic (Chapter 16) – and, as such, any key assumptions or limitations associated with each technical impact assessment are addressed within the individual chapters. The overall approach for collating, assessing, and reporting impacts on human health and well-being is considered to be appropriate and proportionate such that there are no limitations. The assessment, set out in this ES Chapter, is desk-based and with professional judgment using published information.

## Legislative and Policy Context

### National Planning Policy

National Planning Policy Framework (NPPF 2012, updated 2019, and revised 2021)

10.3 The revised NPPF acknowledges the importance of considering health impacts during the planning process and covers many issues that are directly related to the determinants of health. The NPPF identifies the three overarching objectives – economic, social, and environmental – that are

*interdependent and need to be pursued in mutually supportive ways* in order to achieve sustainable development (paragraph 8). The social objective should support "*strong, vibrant and healthy communities… by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being.'*

10.4 Chapter 8 covers promoting healthy and safe communities, acknowledging that planning policies and decisions should aim to achieve healthy, inclusive, and safe places which:

"a) *promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages*.

"b) *are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas*; and

"c) *enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling*." (paragraph 92).

10.5 Social, recreational, and cultural facilities and services should '*support the delivery of local strategies to improve health, social and cultural wellbeing for all sections of the community* (paragraph 93). *It is important that sufficient choice of school places is available to meet the needs of existing and new communities* (paragraph 95). Public safety should be promoted and "*take into account wider security and defence requirements"* (paragraph 97).

10.6 *"Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and wellbeing of communities"* (paragraph 98). Sustainable transport should be promoted and this "*can help improve air quality and public health"* (paragraph 105). "*An effective use of land should be promoted in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions"* (paragraph 119). "*Developments should create places that are safe, inclusive, and accessible and which promote health and wellbeing*…" (paragraph 130). "*New development must be appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health*…" (paragraph 185).

Public Health England (PHE) Strategy (2019)

10.7 Sets out how PHE intends to protect and improve the public's health and reduce inequalities during 2020 to 2025. The Strategy recognises that the longer term, societal drivers of change represent the principal challenge facing the public's health. However, there are opportunities now, including "*place-based approaches"*. The ten priorities include *healthier diets, healthier weight*; *cleaner air;* and *better mental health"* with the aim to incorporate the reduction of health inequalities into each of the ten priorities. The purpose of PHE is to protect and improve the nation's health and reduce health inequalities. This is guided by aims – "*to keep people safe; to prevent poor health; to narrow the health gap; and the support a strong economy"*.

## Sub-Regional Planning Policy (where relevant)

Places for Everyone – Joint Development Plan (Greater Manchester Councils Publication Draft 2021)

10.8 The Vision for Greater Manchester (GM) includes to make Greater Manchester as "*a place where people live healthy lives"*; and Strategic Objectives include No 10 "*to promote the health and wellbeing of communities".* The overall draft Strategy and many of the policies in the plan support improvements in health and wellbeing, and reductions in health inequalities, such as by "*promoting a successful economy; increasing supply of high quality and affordable homes; enabling people to adopt healthier lifestyles*; and *reducing risks to human health".* The JDP recognises that addressing health inequalities will require a diverse range of coordinated measures. The JDP supports improvements in health and wellbeing including through promoting a successful economy, enabling people to adopt healthier lifestyles, and reducing the risks to human health.

## Local Planning Policy

### Manchester City Council (MCC) Core Strategy (adopted 2012)

10.9 MCC's Core Strategy is the key document in Manchester's Local Development Plan. It is founded on a Vision to 2027 that includes "*an increased and sustainable healthy population*…". Policies relevant to health are as follows:

- Policy SP1 Spatial Principles includes requirement that development should make a positive contribution to neighbourhoods including "*making a positive contribution to the health, safety and wellbeing of residents*'
- Policy EC1 Employment and Economic Growth in Manchester requires development proposals to make the best possible use of a site in terms of efficient use of space and including application of best practice in security design.
- Policy EN4 seeks to reduce $CO_2$ emission and reduce fuel poverty by enabling low and zero carbon development.
- Policy EN8 Adaptation to Climate Change includes requirements to minimise flood risk and reduce urban overheating.
- Policy EN9 Green Infrastructure provides guidance on provision of new, and improvements to, the quality and accessibility of existing green infrastructure assets.
- Policies EN10 and EN11 safeguard and create new open space, sport and recreation facilities.
- Health is further protected through Policies EN14 Flood Risk, EN16 Air Quality, EN17 Water Quality, and EN18 Contaminated Land & Ground Stability
- Policy T1 Sustainable Transport requires "*delivery of a sustainable, high quality, integrated transport system to encourage modal shift away from car travel… and to prepare for carbon free modes of transport".*
- Policy T2 will actively manage the pattern of development to ensure that there are accessible areas of opportunity and need.
- Policy T3 supports proposals that contribute to an economically and environmentally sustainable transport network through strategic integration of strategic transport projects. Progression towards sustainable transport will promote healthier living and well-being.
- Policy *DM1 Development Management requires that all development should have regard to specific issues including "Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation*"; Accessibility: *buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes*"; "*Community safety & crime prevention*"; and "*Design for Health.*

### Our Manchester Strategy, Forward to 2025

10.10 The Strategy sets out the future envisaged for the city and the priorities were reset following wide consultation during 2020. Communities want to see a renewed focus on 6 themes, including Health – tackling physical and mental inequalities and ensuring fair access to integrated services.

### Eastlands Regeneration Framework (2017)

10.11 The Framework provides the strategic direction for the Etihad Campus Commercial Zone, including the development of a sports, leisure and recreation economic cluster that builds upon the sporting strengths, vibrancy and success of the Etihad Campus. This seeks to promote positive health outcomes for residents, including connecting local schools and residents to high-quality sports and leisure to improve health, and reinforcing the health and fitness focus on the Etihad Campus and its environs through facilitating cycling and pedestrian movements, and community access to sports and recreation facilities.

## Other Relevant Policy, Strategy & Guidance

### Public Health England (PHE) Spatial Planning for Health (2017)

10.12 Provides evidence of links between spatial planning and health, focusing on five key built environment topics – neighbourhood design, housing, healthier food, natural and sustainable environment, and transport.

### Public Health England (PHE) Health Impact Assessment in Spatial Planning (2020)

10.13 Provides a guide for local authority public health and planning teams setting out process and practice with regard to the wider determinants of health and wellbeing for plan-making and the planning application process. It identifies eight categories of health and wellbeing outcomes in planning: reduce health inequalities; improve mental health & wellbeing; improve diet & weight; improve musculoskeletal health; improve respiratory health; improve cardiovascular health; protect environmental health; and provide access to health & care infrastructure and services. The guide is mostly associated with the plan-making and associated strategic environmental assessment processes. However, it does include an annex on integrating HIA in EIA and it does confirm the importance of a *"proportionate and justified approach".*

### Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in EIA; Determining Significance for Human Health in EIA (November 2022)

10.14 Provides a framework that supports a proportionate approach that can apply to all scales and sectors of EIA. It confirms that a wider determinants approach should be taken by EIA scoping. An EIA health chapter is required when other EIA technical topics have been scoped in to assess likely significant effects on human receptors, or there is a likely significant change for the health of a group of individuals due to the proposed project and in a wider determinant of health not covered by other technical EIA topics.

## Assessment Methodology and Significance Criteria

10.15 Health Impact Assessment (HIA) and health in EIA are separate processes, and there is no standard methodology for assessing health in EIA. The coverage of health in EIA need not be so comprehensive as the HIA that is used to inform detailed project design, but guidance documents for good practice in HIA can inform EIA practice in relation to human health and well-being. It is important that health in EIA is proportionate, balanced, and relevant. The approach here is proportionate - based on consultation responses, the Scoping Opinion, professional experience, and assessment of impacts against relevant baseline information. The Scoping Opinion received from MCC endorsed the proposed approach to human health in EIA. This is a Human Health assessment as part of an EIA; it is not a HIA.

10.16 *Shaping Neighbourhoods: For Local Health and Global Sustainability* (2003, 2010 & 2021) sets out the complexities of planning for health due to the multiple determinants and the need for cross-sectoral understanding and collaboration. This guide established a health map demonstrating the linkages between the global ecosystem, the natural and built environments, the local economy with communities, people, and their lifestyles. It explains the likely interactions between different sectors and seeks a common language for spatial planning and public health practitioners.

10.17 The complexities of investigating health impacts are recognised by Public Health England (PHE) and the Wider Determinants of Health tool is an ongoing project that provides resources for categories of factors that affect health, as follows: built & natural environment; work & the labour market; vulnerability; income; crime; education.

10.18 The London Healthy Urban Development Unit (HUDU) '*Healthy Urban Planning Checklist*' (2017) provides a useful checklist that was developed for London but is applicable to development proposals in urban city centres elsewhere in the UK. The checklist aims to promote healthy urban planning by ensuring that the health and wellbeing implications of local plans and major planning applications are consistently taken into account, through providing a set of themes and planning issues that can be used to assess development proposals. It can be used to help screen possible health impacts for a health impact assessment. Changes in certain determinants caused by development projects may affect the health and wellbeing of existing and new residents. The checklist is divided into four themes – healthy housing; active travel; healthy environment; and vibrant neighbourhoods.

10.19 This HUDU checklist recognises that health and wellbeing can be affected by multiple determinants as shown in Figure 10.1.

10.20 The HUDU has further developed the checklist into a rapid HIA tool (London HUDU, 2019) that uses existing evidence to quickly assess the impacts of a development plan or proposal and recommend measures to address any negative impacts and maximise benefits. The tool is based on eleven topics or broad determinants of health and wellbeing focused on the built environment and issues influenced by planning decisions.

10.21 For the purposes of this Human Health ES chapter, we have applied the HUDU checklist and eleven topics to the proposals in order to help determine the scope of the assessment by identifying the relevant topics. Applicable criteria/questions for each of the scoped topics were considered at the assessment stage in order to assess potential health impacts and the need for any mitigation or enhancement. Existing information and evidence were used, and impact assessment undertaken using professional judgment.

10.22 Housing design and affordability are key factors – provision of good quality residential development is known to have positive effects on health and wellbeing. The North Stand Project does not propose any residential development and thus, this topic is not relevant.

10.23 Access to health and social care services and other social infrastructure is directly important for health. The North Stand Project will not affect accessibility to, or capacity of, health and social care services and facilities. Therefore, these aspects of this topic are not relevant. Accessibility to amenity services, sports/recreational, leisure and cultural facilities are important contributors to health and wellbeing. The North Stand Project includes a new museum and covered fan zone with year-round amenity, together with expansion of the seating capacity to the Stadium – and thus, these elements of this topic will be considered.

10.24 Access to open space and nature is a key factor. The provision of, and accessibility to, open and green spaces, and walking/cycling routes is investigated since access to open space and healthy modes of travelling/movement contribute to healthier lifestyles and wellbeing.

10.25 Air quality, noise and neighbourhood amenity are important factors for health and wellbeing. Summary findings from the technical studies for air quality and noise in the EIA are considered and their implications for health and wellbeing incorporated into this Human Health ES chapter. The external lighting necessary for stadia and events can be disturbing to nearby residents and may affect wellbeing. Summary findings from the lighting impact assessment studies have been taken into account in this Human Health ES chapter. The local wind microclimate can be adversely altered by changes to buildings with the potential to cause safety, comfort and amenity concerns for people and their wellbeing. This has been investigated through EIA studies and the findings have been taken into account in this Human Health ES chapter. There is the potential for structures to limit daylight and sunlight for nearby residents. Whilst not significant in EIA terms, technical studies have been undertaken and the findings integrated into the chapter. Waste management can also be a factor for amenity, health and wellbeing concerns for users and local

communities. Whilst not significant in EIA terms, technical studies have been undertaken and the findings integrated into this Human Health ES chapter. 10.26 **Accessibility and active travel** are well established as factors in health and wellbeing. Summary findings from the technical studies for transport and informing the air quality studies are considered and their implications for health and wellbeing incorporated into this health impact assessment.

10.27 **Crime reduction and community safety** is a key factor in the health and wellbeing of communities and this health impact assessment considers those elements of the development proposals that contribute to safety, and the summary findings from the Crime Impact Statement are integrated into the Human Health ES chapter.

10.28 **Access to healthy food** is a direct factor in health. However, accessibility to a range of food stores with a mix of affordable shops, and provision of allotments or community gardens for growing food are beyond the scope of the development proposal. The wider regeneration of the Etihad Campus includes the Mancgroves with the Bridge College allotments and ecological enhancement planned, but this is not significant in EIA terms.

10.29 **Access to work and training** is known to affect health and wellbeing. The delivery of commercial/workspace and a hotel will contribute to the wellbeing associated with access to employment. The implications for jobs, training and economic factors were identified to be not significant in EIA terms. However, access to work and training, particularly for local communities, can have significant effects for people's health and wellbeing, and the findings from the technical studies were considered within this Human Health ES chapter.

10.30 **Social cohesion and inclusive design** are key factors for health and wellbeing. This Human Health ES chapter considers the implications of the design and project proposals in this respect, including connectivity, the potential for non-cohesion with existing communities, and proposals for enhancing engagement and social cohesion.

10.31 **Minimising use of resources** and **addressing the effects of climate change** are key factors in considering environmental sustainability and a healthy environment – and consequently, health and wellbeing for people and communities. Risks associated with flooding and ground contamination, and risks associated with extreme weather conditions, wind and climate change are considered within this health impact assessment.

10.32 Overall, the Human Health in ES chapter aims to consider impacts associated with the construction and the occupational phases. It considers embedded mitigation provided through the design of the project – such as layout, and building standards, together with specific mitigation for potential negative effects – such as the commitment to a Construction Environmental Management Plan (CEMP) to control and minimise any effects associated with nuisance noise and dust.

10.33 This Health chapter considers the direct implications for health such as the provision of commercial, workspace, and cultural/sports/recreational facilities. Also, direct effects such as those arising through pollution, air quality, climate change, and safety risks, as well as accessibility to sustainable transport (public, cycling and walking) for healthy living.

10.34 The key findings from the Air Quality (Chapter 6); Climate Change (Chapter 7); Flood Risk & Drainage (Chapter 8); Ground Conditions (Chapter 9); Noise & Vibration (Chapter 11); Townscape/Visual Impact (Chapter 12); Traffic & Transport (Chapter 13); Wind Microclimate (Chapter 14); Lighting (Chapter 15) and Socio-Economic (Chapter 16) assessments are considered in order to integrate within this Health chapter the key impacts associated with any pollution and future climate change effects that can affect human health and wellbeing. There are a number of other factors that were investigated and identified as not being of significance in EIA terms, including waste and litter, crime impact, and daylight/sunlight. Whilst not individually significant enough to be scoped into the EIA, the potential for interaction between topics and cumulative effects, particularly of factors for neighbourhood amenity and wellbeing, is recognised and considered within this Human Health ES chapter.

10.35 Each technical impact assessment is subject to its own standards, regulations, and methods of assessment. The key findings from each are considered and integrated overall into the relevant themes for health urban living. Thus, any significant impacts for human health are clearly presented in a separate chapter.

10.36 This chapter on health is not a Health Needs Assessment and does not attempt to quantify health care contributions. It should also be noted that certain health issues are not scoped into the EIA due to their coverage within other permitting or risk management processes. For example, health & safety, emergency planning, and building requirements are addressed by other relevant regulation and this does not require further consideration beyond noting that it helps mitigate community health concerns.

10.37 The geographical scope is determined by receptor groups that are likely to be significantly affected by the proposed development. The scope of the Health Chapter is in part dependent upon the study areas and potential receptors identified in the other technical assessments (air quality, climate change, flood risk, ground conditions, noise, visual, traffic and wind). Thus, the study area comprises the proposed development site with local surrounds and the wider study area of Manchester City – as applicable to each of the factors relevant to human health and wellbeing for the proposed project. The scope of the human health impact assessment chapter is as outlined above and is undertaken in consideration of the proposed development as part of a wider strategic development area.

10.38 Receptors were identified, as follows:

- construction workers
- existing residents, businesses, communities around the site, and including any sensitive receptors such as hospitals, nurseries, schools, care homes identified by the technical assessments
- future users and visitors of the site
- pedestrians in the vicinity of the site

10.39 The Institute of Environmental Management & Assessment (IEMA) paper on Health in EIA (2017) explains the complexities associated with defining significance for population and human health. This guidance notes that there is an absence of specific significance criteria or defined thresholds for determining significance for population and health in UK EIA practice. Given the multitude of factors that contribute to an individual's health outcomes, it is difficult to draw a quantified conclusion regarding the contribution of a particular development to an increase or decrease in the number of additional cases of a particular physical or mental health outcome.

10.40 The recent IEMA guidance (November 2022) suggests categories and wider determinants of health, and those relevant to the Proposed Development were identified, as follows:

Table 10.1 EIA Wider Determinants of Health – Relevant to the North Stand Project

| Category | Wider Determinants of Health – Relevant to North Stand Project |
|---|---|
| Health related behaviours | Physical activity |
| Social environment | Open space, leisure & play; transport modes & access; community safety; community identity & resilience; social participation, interaction & support |
| Economic environment | Employment & income |
| Bio-physical environment | Climate change mitigation & adaptation; air quality; land quality; noise & vibration |
| Institutional & built environment | Built environment; wider societal infrastructure & resources |

10.41 The guide also sets out a generic human health magnitude criteria and significance criteria, as follows – and aligned with the descriptors used throughout this ES shown in ***bold italics***:

Table 10.2 Human Health Magnitude Criteria

| Category | Indicative Criteria (narrative based on professional judgment for magnitude change of population or sub-population |
|---|---|
| High<br>***Major*** | high exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications |
| Medium<br>***Moderate*** | low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications |
| Low<br>***Minor*** | very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications |
| Negligible<br>***Negligible*** | negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication |

Table 10.3 Human Health Significance Matrix

| | | Sensitivity | | | |
|---|---|---|---|---|---|
| Magnituden | **Magnitude** | High<br>***High*** | Medium<br>**Moderate** | Low<br>***Low*** | Very Low |
| | **High** | Major | Major/Moderate | Moderate/Minor | Minor/Negligible |
| | Medium | Major/Moderate | Moderate | Minor | Minor/Negligible |
| | Low | Moderate/Minor | Minor | Minor | Negligible |
| | Negligible | Minor<br>/Negligible | Minor/Negligible | Negligible | Negligible |

10.42 Therefore, a significant effect is reported in this assessment where, based on professional judgment, the proposed development is likely to contribute to a material change in health outcomes associated with the health issue being assessed and, in determining this, the following questions have been considered:

- Have significant effects been identified in other assessments undertaken as part of the EIA that are linked to human health (i.e. are environmental or health standards threatened)?
- Are vulnerable groups affected?
- Is the effect reversible or irreversible?
- Does the effect occur over the short (less than one year), medium (one to five years) or long (over five years) term?
- Is the effect permanent or temporary?
- Does it increase or decrease with time?
- Is the effect at an individual, community or population level?
- Are mitigating measures available and is it reasonable to require these?

10.43 Effects that are described as 'minor' or 'negligible' are determined to be 'Not Significant' and effects that are described as 'moderate' or 'major' are determined to be 'Significant'. This takes into account the sensitivities of receptors (high, moderate, low) and as set out previously in Table 2.4 in the EIA

Methodology (Chapter 2). The criteria and categories of significance applied in this human health impact assessment are, as follows:

- Major Adverse/Beneficial – important considerations at local or district scale; if adverse, are potential concerns to the project and may become key factors in the decision-making process; changes due to the project have a substantial effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being crossed
- Moderate Adverse/Beneficial – modest important local effects that, if adverse, may be key issues for decision-making; changes due to the project have an influential effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being approached
- Minor Adverse/Beneficial – Slight, short, or highly localised effects that, if adverse, are unlikely to be important in the decision-making process; changes due to the project have a marginal effect on ability to deliver current health policy and/or ability to narrow health inequalities
- Negligible – no appreciable effects on health factors

10.44 Standardised sectoral thresholds and significance criteria have been used for each of the relevant technical factors that contribute to health and well-being, according to recognised guidance, standards, and assessment methods for air quality; climate change; flood risk & drainage; ground conditions; noise & vibration; visual impact; traffic & transport; and wind microclimate. Then, the overall likely significant effects on health have been determined in a qualitative way using professional judgment.

10.45 The following scenarios were considered within the EIA:

- Scenario 1 – Existing site (baseline) with committed developments
- Scenario 2 – Baseline as 2014 extant consent (qualitative assessment)
- Scenario 3 – Baseline (as per scenario 1) plus Proposed North Stand development
- Scenario 4 – Baseline (as per scenario 1) plus Proposed North Stand development and mitigation

## Baseline Conditions

10.46 The Site is located within the Ancoats and Beswick Ward of Manchester. The stadium site is bounded by Ashton New Road to the south, Alan Turing Way to the east, Rowsley Street to the west and Joe Mercer Way and Sportcity Way to the north. The stadium site consists of the main stadium building, with its distinctive shaped roof, along with associated surface car parking around the east and west sides. The National Squash Centre and the Regional Athletics Centre are situated to the north west of the football stadium. The main vehicle access to the site is from Ashton New Road which leads to the City at Home offices (a two storey building) and the main 'day to day' surface car park.

10.47 The Etihad campus area was formerly heavy industrial land. The campus is a cluster of national sports venues such as the regional tennis centre, regional athletic arena, velodrome, national squash centre and new BMX arena. The Manchester City Football Academy has been delivered, along with the Beswick Community Hub, a 600 place sixth form college, with leisure and retail centre. Beyond the Etihad campus, the area is of mixed character comprising commercial and residential uses. There is a relatively dense residential estate of two storey terrace properties to the southern side of Ashton New Road. The historic Philips Park is located to the north east of the stadium and Eastlands District Centre, including Asda superstore, is located to the east.

10.48 The baseline informing the assessment draws upon local health and wellbeing information and priorities, such as those set out in the Manchester City Joint Strategic Needs Assessment (JSNA 2022), published local authority health profiles through Public Health England (PHE, 2018-2020), and as reported by Manchester City Council, for example, through the MCC Intelligence Hub. The key baseline from the other

technical topics is considered, including risks to health/wellbeing such as from air quality, noise, and risks associated with the effects of climate change. The key baseline information from the townscape and socio-economic studies has been considered. It has not been necessary for this assessment to undertake primary research or surveys and this desk-based approach using published information and professional judgment provides an appropriate level of detail.

10.49 Population & Health: According to PHE data (2018-2020), life expectancy at birth for Manchester is 75.5 (males) & 79.9 (females) compared with 79.4 (males) & 83.1 (females) averaged for England. Provisional estimates of life expectancy at birth show the impact of the Covid-19 pandemic. The size of the fall in life expectancy in Manchester is more than that seen in England overall, widening inequalities in life expectancies between Manchester and the national average. Physically active adults (2019-20) are recorded at 62.4% for Manchester, lower than that averaged for England at 66.4%. Percentage of adults classified as overweight or obese are recorded at 61.0%, slightly lower than the 62.8% averaged for England. The excess winter deaths index (2019-20) at 18.3% was slightly higher than the averaged value of 17.4% for England.

10.50 The Proposed Development is located in the Ancoats & Beswick Ward. According to MCC Intelligence Hub information using Ward profiles, the Ancoats & Beswick Ward has life expectancy at birth for females at 80.2 and for males at 77.7 years (2016-2020) – these are higher than Wards adjacent to the north, east and south. The Index of Multiple deprivation (IMD) is an overall relative measure of deprivation constructed by combining seven domains of deprivation – Income; Employment; Education; Skills & Training; Health & Disability; Crime; Barriers to Housing Services and Living Environment. The Ancoats & Beswick Ward has a IMD score (2019) of 40.89 which is lower than Wards adjacent to the north, east and south, indicating that the Ward is less deprived than these others.

10.51 Employment: The number of residents aged 16+ claiming unemployment benefit (JSA & UC, February 2023) is 465 which is in a similar range to the adjacent City Centre Ward to the west and lower than those adjacent Wards to the north, east and south. Manchester is ranked as the 8th most income-deprived local authority in England with 22% of its population considered to be 'income-deprived.

10.52 Crime: The total reported street crimes for the Ancoats & Beswick Ward is 2,753 (2018) and this is lower than the other Wards surrounding. There were 520 recorded crimes in the neighbourhood around the Site (February 2022-January 2023). This volume of crime is well above the average for a neighbourhood within Manchester but not significantly greater than many other inner-city neighbourhoods. There were 163 offences recorded at the stadium, of which violent and public disorder crimes accounted for 64% of the total, with theft 12%, drug offences 11%, and criminal damage 10%. Whilst the risk of vehicle crime is very low, incidents are more frequent on a Monday and Saturday, especially during the evening.

10.53 Open Space, Recreation & Amenity: There a number of open/amenity spaces in proximity to the Site including parks such as Bradford, Philips and Clayton within 1 mile walk. There are gyms and leisure centres, and easy access to long distance walking and cycling, such as the River Medlock and the Ashton Canal. Of course, the existing use of the Etihad Stadium is an international modern sports venue offering event spaces and for wider networking and training. Waste, litter, and daylight/sunlight can be factors that adversely affect neighbourhood amenity. The Proposed Development will be at its busiest on a match day and it is at this type of event that most waste will be generated.

10.54 Air Quality: An AQMA has been declared across Manchester city centre and surrounding arterial roads owing to consistent exceedances of the air quality objective for the annual average concentration of $NO_2$. Poor air quality is a persistent issue, and road transport substantially impacts local air quality conditions. A small eastern portion of the Site is located within the AQMA.

10.55 Climate Change: Greenhouse gas (GHG) emissions occur constantly and widely as a result of human and natural activity. The current use of the Site is as a stadium and estimated greenhouse gas (GHG) emissions have been taken from the Manchester City Game Plan: Sustainability Report 2022.

10.56 **Water & Flood Risk**: The nearest water feature to the Site is Ashton Canal, approximately 35m to the north. The nearest natural watercourse to the Site is the River Medlock, which is culverted to the north of the Site. It is understood that surface water from the Site currently drains to the UU sewer to the north of the Site, and that this sewer subsequently flows into the River Medlock. The ecological potential of the river at this section was classified as 'moderate' owing to its poor biological quality (specifically for fish), and high levels of specific pollutants; the chemical status was classified as 'failing'. The entirety of the Site is located within Flood Zone 1, which is defined as having a low risk of flooding. The majority of the Site is classified as having a low or very low probability of surface water flooding. The Proposed Development is at a low risk of flooding from artificial sources, the Ashton Canal, and will have no impact in terms of flood risk to the surrounding area.

10.57 **Ground Conditions**: There is significant industrial past uses of the Site and the Made Ground is likely to comprise a range of material types. The ground conditions are unlikely to change as a result of the Proposed Development, any enabling works will be managed under standard good practice, likely improving the shallow ground conditions as a result.

10.58 **Noise & Vibration**: Six receptors representing sensitivity to noise were identified around the Site and comprised residential locations. Surveys were undertaken to establish the baseline noise environment during the day and the night. It was found that the baseline noise conditions were dominated primarily by road traffic noise. However, it was also noted that during events, the associated noise from within the stadium (e.g., crowd and PA addresses during football matches, amplified music during concerts, and amplified entertainment from operation of the fan zone) may dominate.

10.59 **Townscape & Visual Impact**: The Site is located to the north-east of Manchester city centre and located within the Etihad Campus. This defines the local townscape character and urban grain, with large modern structures set within extensive areas of open concourse and landscape. Whilst the Campus is focused on sport, recreation and commercial activities, immediately around it are a number of large residential estates.

10.60 **Traffic & Transport**: The Site is located in a key strategic location and is surrounded by a number of heavily trafficked roads, as well as commercial areas and local residential streets. There are strong connections to a range of public transport modes including buses and Metrolink; and there are many walking and cycling routes available locally and connecting to the city centre and wider environs including national routes.

10.61 **Wind Microclimate**: The prevailing wind across Manchester is from the south and south-west, with some lesser contributions from all other directions . In the baseline condition, the Site is largely exposed to the east and south. Surrounding buildings include the Co-op live arena (currently under construction) and the Manchester regional arena. Analyses found that there are no safety or comfort exceedances for the baseline configuration for the concourse, the terrain, nor for the seating. The future baseline is likely to be similar to the current condition.

10.62 **External Lighting:** The Proposed Development is located in an area with high street light levels and is situated adjacent to buildings with high intensity light sources (including the Etihad Stadium, Manchester Regional Area). Thus, the night time image of the area has already been affected by existing development.

## Identification and Evaluation of Significant Effects; Mitigation Measures

10.63 **Employment**: The economic impact assessment studies found that the Proposed Development will create a significant number of new jobs in Manchester and Greater Manchester and many of these jobs will be taken up by local residents, helping to generate increased economic activity, retain skilled people within the area and bring more people into employment. The development of the Etihad together with a new hotel, new events venue, new food and beverage outlets and new visitor attractions will enable the club, its partners and tenants to offer more high quality, year-round non-matchday employment which is more likely to be fulltime and permanent as opposed to the seasonal/matchday/temporary employment

that is currently prevalent. Plans also include skills training and professional development. Provision of employment and skills training will have **Moderate Beneficial** effects for health and wellbeing.

10.64 **Crime**: Features of the physical environment can influence patterns of criminal and anti-social behaviour. The crime impact assessment studies identified aspects of the local environment that might help reduce the risk of crime and disorder on and around the Site; features that might facilitate crime and disorder were also considered. The studies detailed those elements of the Proposed Development that are likely to promote public safety and deter crime and disorder, including the high quality of the development, the mix of uses, the generation of activity in the area, security and management, and a commitment to enhancing the semi-public realm around the Site. Recommendations to enhance the security of the Proposed Development and its surrounding are also made. Overall, it is considered that there will not be any significant adverse effects arising from the Proposed Development. The increased activity and mix of uses, together with design and management, are likely to have **Moderate Beneficial** effects for health and wellbeing associated with crime.

10.65 **Open Space, Recreation & Amenity**: The provision of an enhanced facility for high quality sports, with match and concert events, will have beneficial effects for sports, leisure and recreation. A new hotel, new events venue, new food and beverage outlets and new visitor attractions will all contribute to increasing the recreational, amenity and leisure facilities to offer more high quality and year-round possibilities that will have beneficial effects for these factors that affect human health and wellbeing. Daylight and sunlight exposure on amenity spaces within the boundary of the Proposed Site were assessed and changes to sunlight were found to be Minor Adverse, Not Significant, on City Square. Sunlight impacts were found to be Negligible on landscaped areas adjacent to the hotel entrance and access road. The Waste Management Strategy has been formulated to help operation be efficient, sustainable, and safe with a focus to minimise waste. The changes proposed will provide resilience and improve the efficiency of waste operations such that there will be Moderate Beneficial effects. The wider regeneration planned for Mancgroves includes safe and accessible walking routes, regeneration of Five Sisters an active park and Cyrus Park an old city park, and the Bridge College allotments – all for diverse leisure, activity and pleasure – with **Moderate Beneficial** effects for health and wellbeing.

10.65 **Air Quality**: During the construction phase, there is the potential for dust soiling and risk to human health and wellbeing from dust associated with earthworks, construction material and track out during movement of construction vehicles. The surrounding area has a some receptors sensitive to dust soiling and the sensitivity for human health effects is considered to be low. Detailed mitigation measures will be set out in the Construction Environmental Management Plan (CEMP) to control and reduce vehicle emissions and dust through various procedures and practices. This will reduce the temporary impacts to Not Significant and the construction impacts on air quality at all receptors are **Negligible**.

10.66 During the operational phase, there is potential for air quality impacts associated with the proposed combustion plant and energy strategy; and also from traffic emissions. Space heating/cooling for the Proposed Development, and water heating for the North Stand (except toilets) and the hotel will be met through air-source heat pumps. Due to the limited hours of emergency generator usage and the separation of the generator flues from existing and proposed receptors, the impact of generator emissions on air quality will be **Negligible**. Given the uncertainty in future air quality conditions, it is assumed that there will be no improvement in background concentrations of traffic emissions from 2019, for all future assessment years. Overall, the impact of emissions from operational traffic on existing receptors (residential and healthcare facilities) was found to be **Negligible**.

10.67 **Climate Change**: The technical studies investigated the risk assessment of the impacts on climate change on the Proposed Development over its projected life cycle (assumed to be 60 years). The assessment considered GHG emissions associated with the material extraction, transportation and manufacturing of construction products, together with GHG emissions associated with delivery to Site and installation. Effects were found to be **Moderate Adverse** for the global atmosphere during construction. For the operational phase, the assessment considered GHG emissions from practical completion to the end of service life, including energy and water consumption. Mitigation measures were developed as integral to the project design to reduce the significance of potential risks of adverse effects. During construction,

embedded measures include circular economy principles applied through aa whole life carbon assessment, and re-use of material. For the operational phase, embedded mitigation includes a committed route map to be net zero carbon by 2038, energy and water efficiencies, and low carbon technologies. Effects for the operational phase were found to be **Moderate Adverse** embodied carbon associated with the in-use stage, for GHG emissions associated with water consumption, and for GHG emissions associated with the end-of-life stage. GHG emissions associated with operational energy were predicted to be **Minor Adverse**.

10.68 **Water & Flood Risk**: During the construction phase, the risk of pollutants and sediments causing adverse effects on the water quality of the River Medlock and Ashton Canal is minimised through implementation of the CEMP and residual effects were identified to be **Negligible**. Potential adverse effects associated with increased water demand and surfacewater drainage were found to be **Not Significant**. Flooding risks to human health and safety were identified to be **Negligible**. During the operational phase, effects on water quality were found to be Negligible; effects on water supply demand and foul water drainage are increased to Minor Adverse, which is Not Significant in EIA terms; and flood risk to the users of the Site was found to be **Negligible**.

10.69 **Ground Conditions**: During the construction and operational phases, there is the potential for risks to human health (workers, visitors and neighbours) from contact with any contaminated land, dust, vapours or hazardous gases. There is also risk for contamination of water resources, plant health, and damage to the built infrastructure. The technical studies found that there are limited potential risks to people and the environment associated with the Proposed Development and the ground conditions on-site during the construction phase. Mitigation measures, informed by site investigations and defined in Remediation Strategy and contractor's method statements, etc. will ensure appropriate design and construction during development. On completion of the Proposed Development, all potential operational effects assessed to be **Negligible**.

10.70 **Noise & Vibration**: During the construction phase, there will be noise impacts associated with fixed and mobile plant, and traffic movements. All road links are predicted to have no increase in road traffic noise, and predicted noise levels for construction works were found to be Not Significant. There is also the potential for vibration effects through activities such as piling but the nearest receptor is distant from that at which any adverse effects would be expected – therefore, **Not Significant**. During the occupational phase, there is the possibility for noise changes associated with football and concert events, the fan zone, and road traffic. Most of the impacts were predicted to be **Negligible** or no change. Receptors at the north of the stadium were found to have beneficial effects associated with screening from the greater height of the stand and additional buildings; all receptors were found to benefit from the additional screening around the fan zone. No significant effects are expected from road traffic noise associated with the Proposed Development. No significant impacts are expected from external fixed building services plant.

10.71 **Townscape & Visual Impact**: During the construction phase, sources of townscape and visual effects include site set up and compound, boundary fencing, site clearance, groundworks, access, and contractor parking, plant and equipment. Measures to control construction impacts will be incorporated into a Construction Environmental Management Plan (CEMP) and are likely to include high quality site hoarding, and good site management, maintenance and housekeeping. Temporary effects are mostly **Minor Adverse**.

10.72 For the occupational phase, mitigation has been embedded through consultation and iterative design. This includes key principles of massing to be consistent with the existing Stadium, materiality and façade treatments to define new building, and supporting development of the sporting facility and sports campus. Thus, the potential for adverse townscape and visual impacts has been minimised and opportunities for beneficial impacts have been integral to the design process and no significant adverse impacts are predicted. The effects on townscape and Site characters were found to **be Moderate Beneficial**; most of the viewpoints assessed were found to be **Minor Beneficial** with two out of the ten found to be **Moderate Beneficial**.

10.73 Traffic & Transport: The overarching aim of the transport strategy for the stadium expansion is to maintain and not increase existing levels of parking. New journeys generated by the stadium expansion would use alternative modes to the car. During the construction phase, there will be additional construction vehicle movements on the highway network and mitigation measures such as timing and management will be implemented through the CEMP such that temporary residual effects are predicted to be Negligible. During the operational phases, effects on traffic increase, driver delay and safety are predicted to be Negligible.

10.74 Wind Microclimate: With conditions meeting the Lawson safety criteria and being suitable for intended uses when assessed against the Lawson comfort criteria, residual effects are Negligible for pedestrians in most areas except for one small area around the south of the stadium with Minor Adverse effects that are Not Significant in EIA terms.

10.75 External Lighting: The studies identified potential sensitive receptors for people's health and wellbeing at four residential sites and one traffic route along Alan Turing Way. Artificial lighting will be required during the construction phase at early evening hours while works are carried out, and low illuminance safety lighting will be operating after working hours. The temporary residual effects were identified to be Negligible for all human receptors. During operation, the effects of light spill, glare and sky glow are considered to be Negligible for all human receptors. This is due to the carefully implemented new lighting installation and controllable LED media screens – such embedded mitigation measures result in Negligible residual effects from external lighting.

10.75 Health & Wellbeing: Overall, the potential environmental impacts for human health and wellbeing have been assessed and there are no significant residual adverse effects predicted. There will be no significant adverse effects on air quality, noise and community amenity, including crime, fear of crime and community safety. Studies have identified those elements of the Proposed Development likely to promote public safety and deter crime and disorder; further recommendations have been made to enhance the security of the area and its surroundings. The effects from external lighting were assessed and found to be negligible for residents and drivers. The impacts on sunlight for City Square and landscaped areas by the hotel were found to be not significant. A Waste Management Strategy is proposed with an emphasis on minimisation and the improvements will have beneficial effects. Overall, likely effects are beneficial for health and wellbeing associated with neighbourhood amenity factors.

10.76 There will be no significant adverse effects associated with risks from contaminated land and flooding, nor from the capacity of water resources and the wastewater system. The use of resources and the effects of climate change have been assessed; risks to health and wellbeing have been assessed and reduced to levels acceptable according to the relevant standards and regulations. Townscape character and visual amenity can affect health and wellbeing. These factors were integrated into the iterative design such that mitigation measures for any adverse effects were embedded through the design process. There are no residual adverse effects for townscape and visual impact – overall, effects are beneficial.

10.77 Accessibility to amenity services, sports, recreational and leisure facilities is important for health and wellbeing. The Proposed Development will enhance the available facilities with beneficial effects for visitors, local residents and communities. Active travel is vital for health and wellbeing - the encouragement and facilitation for sustainable movement, including for cycling and walking, will have beneficial effects for users, visitors and local residents. The connectivity with the wider sustainable travel network is likely to have further benefits beyond the local area and contribute to community cohesion. The enhancements to biodiversity and open/green space will encourage access and use with further beneficial effects for health and wellbeing for users, visitors and local residents. Employment and training are important for health – the Proposed Development will create a significant number of jobs and many of these jobs will be taken up by local residents, helping to generate increased economic activity and retain skilled people within the area. Together with plans for skills training, likely effects for employment and training on health and wellbeing will be beneficial.

## 2014 Extant Consent

10.78 The 2014 consent acknowledged that the enhanced facilities will improve the visitor experience, and create some job opportunities that will be available for local residents and business. In addition, there is the opportunity to provide improved access to the facilities at the stadium for local residents. Overall this is likely to contribute positive effects for health, wellbeing and community cohesion as the stadium will act as a catalyst of regeneration. An expanded stadium has the potential to bring significant benefits to the local area for employment and health as part of the continued regeneration of East Manchester.

10.79 It was noted that any increase in capacity of the stadium will create additional noise and disturbance on match and event days along with additional uptake in walking, cycling and use of public transport within the local area and potential impact on on-street parking. It was considered that such matters can be addressed through mitigation measures. Aspects of the proposal have been designed to minimise the impact on nearby residential properties, for example, design of the roof to avoid overshadowing, consideration of lighting to avoid sky glow and glare, and surfacewater run-off by the enhanced drainage system.

10.80 For those technical topics relevant to health and wellbeing, the baseline conditions since 2014 have been updated and the environmental impact reassessed. The expansion of the north stand covered by the extant consent is similar in size and additional capacity to what is included in the Proposed Development – and therefore, the assessment findings are similar for most of the technical studies. The Proposed Development includes buildings – commercial, workspace, and a hotel – that are additional to the extant 2014 consent and the likely effects of these elements have been investigated through the technical assessments; the residual impacts mostly found to be Negligible/Not Significant; no significant adverse effects were found for any health and wellbeing factors. The additional buildings to the north of the stadium provide screening with beneficial impacts for noise that were not present with the 2014 scheme.

## Cumulative Effects

10.81 Each separate technical topic has considered the relevant effects for health and wellbeing that could be cumulative with other nearby development projects. During the temporary construction phase, the implementation of mitigation measures to protect health and wellbeing to acceptable levels is ensured through the Construction Health & Safety Plan (HSP) and Environmental Management Plan (CEMP). During the approximately three year construction time period, there are the possibilities for cumulative adverse impacts on air quality - dust soiling from activities and emissions from transport; transport disturbance; and loss of amenity for pedestrians and motorists. However, cumulative effects were identified to be Negligible through implementation of the CEMP. There are no significant cumulative effects predicted for noise. The construction period is planned to last until 2026. Although climate forecasts show that as a result of climate change, Manchester is likely to experience slightly wetter winters and drier summers, this time frame is not significant and current climatic conditions are considered representative of the climate during the construction period. Therefore, based on the current climate forecasts during the construction period and the construction timeframe, there is not a need for specific adaptation measures to reduce the risk from climatic effects during construction.

10.82 During the operational phase, assessment indicates that cumulative air quality impacts are negligible at all receptors. No additional impacts are expected to occur in terms of noise and vibration generated from within the Site. As there are GHG emissions associated with almost all new developments globally and that we are approaching a global climate tipping point, it may be stated that cumulative effects are significant. The development is expected to be completed and fully operational by 2026. Climate forecasts looking beyond this time predict that by 2080 the north west of England will likely experience approximately 30% more precipitation during the winter with a mean daily temperature change of 5-6 degrees, and 30% less precipitation during summers with a mean daily temperature change of 5-6 degrees. The Proposed Development is well safeguarded against risks from associated with climate change effects associated with health and wellbeing.

## Residual Effects

10.83 Post mitigation residual effects are summarised in the table 10.5, as follows:

Table 10.5 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| Economic – jobs & training | Moderate Beneficial | None required | Moderate Beneficial |
| Climate Change – Global Atmosphere | Major Adverse | Reduce embodied carbon, re-use materials, energy & transport efficiencies | Moderate Adverse |
| Air Quality - dust | Medium-Low | CEMP | Not Significant |
| Water & Flood Risk – river/canal quality | Negligible | CEMP | Negligible |
| Water & Flood Risk – supply & drainage | Minor Adverse/Negligible | N/A & CEMP | Minor Adverse/ Negligible |
| Water & Flood Risk – flood risk – workers on site | Negligible | CEMP | Negligible |
| Ground Conditions - Workers & off-site users/visitors | Negligible | CEMP | Negligible |
| Noise & Vibration | None | None required | Negligible |
| Townscape & Visual - Residents & visitors | Minor- Moderate Adverse | CEMP | Minor- Moderate Adverse |
| Traffic & Transport | Traffic increase | CEMP | Negligible |
| External Lighting – residents & drivers | Negligible | CEMP, design | Negligible |
| Operational | | | |
| Economic – jobs & training | Moderate Beneficial | None required | Moderate Beneficial |
| Crime – users, visitors & residents | Moderate Beneficial | None required | Moderate Beneficial |
| Open Space, Recreation & Amenity - Users, visitors & residents | Moderate Beneficial | None required | Moderate Beneficial |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Sunlight – workers & users amenity open spaces | Negligible | None required | **Negligible** |
| Waste Management – workers, visitors, residents | Moderate Beneficial | None required | **Moderate Beneficial** |
| Air Quality | None Significant | None Required | **Not Significant** |
| Climate Change – Global Atmosphere Embodied Carbon | Major Adverse | Reduce embodied carbon, extend longevity of material, minimise use | **Moderate Adverse** |
| Climate Change – Global Atmosphere GHG energy | Minor Adverse | Explore passive design for hearting, energy efficiencies | **Minor Adverse, Not Significant** |
| Climate Change – Global Atmosphere GHG water | Moderate Adverse | Measure water consumption | **Moderate Adverse** |
| Climate Change – Global Atmosphere GHG end of life | Major Adverse | Reduce lifecycle embodied carbon | **Moderate Adverse** |
| Water & Flood Risk – water quality | Pollutants – Negligible | None required | **Negligible** |
| Water & Flood Risk – demand & drainage | Capacities – Minor Adverse | Water efficiencies | **Minor Adverse, Not Significant** |
| Water & Flood Risk – flood risk to users | Flood risk – Negligible | None required | **Negligible** |
| Ground Conditions- Site users/visitors | Negligible | None required | **Negligible** |
| Noise – match, concert, fan zone, traffic, building plant - Residents nearby | **Negligible/Not Significant Minor/Moderate Beneficial** to the north from matches & events **Major Beneficial** from fan zone for all receptors | None required | **Negligible/Not Significant Minor/Moderate Beneficial** to the north from matches & events **Major Beneficial** from fan zone for all receptors |
| Townscape & Visual - Users, visitors & Residents | Minor – Moderate Beneficial | None required | **Minor – Moderate Beneficial** |
| Traffic & Transport - Residents & visitors | Negligible | None required | **Negligible** |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Wind Microclimate – workers & visitors** | Minor Adverse ( one small area) – Negligible | None required | **Minor Adverse** ( one small area) – **Negligible** |
| **External Lighting – residents & drivers** | Negligible | Design & Lighting Controls | **Negligible** |

## Reference List

This ES Chapter has been prepared by reference to the following:

National Planning Policy Framework (NPPF, updated 2019 & revised 2021)
https://www.gov.uk/government/publications/national-planning-policy-framework--2

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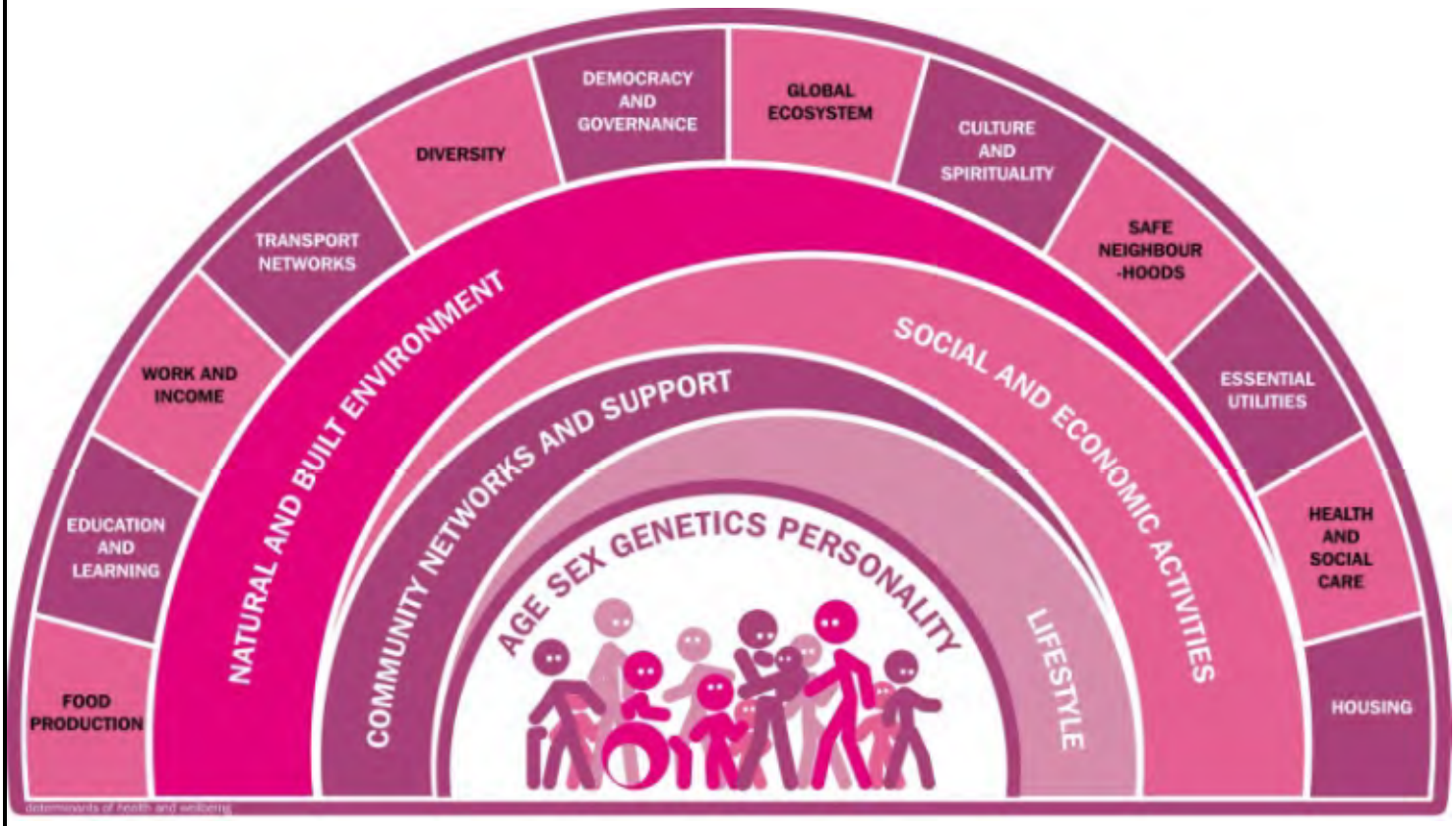
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| | | | | |
|---|---|---|---|---|
| | **Figure:** | **10.1** | | |
| | **Title:** | The Determinants of Health and Wellbeing (London HUDU developed from Barton & Grant 2007) | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2022** | **Scale:** | **NTS** |

# 11 Noise and Vibration

## Introduction

11.1 This Chapter of the ES has been prepared by Vanguardia (a Buro Happold Company) and assesses the likely noise and vibration impacts of the Proposed Development upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts, and the likely residual impacts after these methods have been adopted.

11.2 This Chapter is accompanied by six technical appendices. comprising the following technical appendices, referred to as required within the body of the Chapter:

- National Planning Guidance Noise Hierarchy (Appendix 11.1);
- Construction Data (Appendix 11.2);
- Operational Road Traffic Data (Appendix 11.3);
- Noise Survey Results (Appendix 11.4);
- Construction Results (Appendix 11.5); and
- Operational Road Traffic Results (Appendix 11.6).

| Technical Competence in Noise and Vibration and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Chris Goff | Anne Thompson |
| Company | Vanguardia (a Buro Happold Company) | Vanguardia (a Buro Happold Company) |
| Qualifications/Accreditations relevant to technical area | MSc Environmental and Architectural Acoustics, Member of the Institute of Acoustics (MIOA) | Institute of Acoustics Diploma in Acoustics and Noise, MIOA |
| Does the practitioner hold any IEMA qualification? | No | No |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 11.5 | 13 |
| Number of EIA's delivered to date | >10 | >10 |

## Limitations and Assumptions

11.3 All acoustic assessment tools, whether calculations, modelling tools or survey measurements, have a degree of uncertainty associated with the results. The choices made in configuring acoustic models, choosing the input data, and analysing the measured data will dictate whether the final predicted impact

should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e., tending towards worst-case). To take a robust approach to this assessment, reasonable worst-case, rather than central-estimate, assumptions have been used wherever possible.

11.4 It is impracticable to measure the existing noise climate or predict and assess noise at every individual receptor. Noise monitoring locations used for the noise survey have been selected to provide data considered representative of the wider areas of receptors around the Site, and receptors have been chosen based on them being the most exposed to noise from the Proposed Development as a worst-case.

11.5 Regarding construction plant, methodologies, and the programme referenced for the assessment of construction noise, the best available information has been used following discussions with the contractor. However, these details may change as the works progress and alternate methods are identified or unexpected obstacles are encountered.

11.6 The operational and construction traffic noise assessments have been based on data supplied by the project's traffic consultant, and are subject to the limitations and assumptions inherent within that dataset. Detailed discussion of how the traffic data has been derived, and the limitations associated with it, can be found in Chapter 13 Traffic and Transport of this Environmental Statement.

11.7 Detailed information regarding the type and number of external building services plant units is not yet available so this noise source has not been assessed directly. However, target plant noise levels at nearby receptors to be used in the design and specification of plant have been provided.

## Legislative and Policy Context

### National Planning Policy

#### National Planning Policy Framework, 2021

11.8 The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how these should be applied. Its central aim is to contribute to the achievement of sustainable development.

11.9 The potential impacts of noise are addressed in the following paragraphs of the NPPF:

- Paragraph 174e:

  *"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, taking into account relevant information such as river basin management plans"*

- Paragraph 185:

  *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

  *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*

*b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*

11.10 Paragraph 185a includes a direct reference to the Noise Policy Statement for England for further information regarding the potentially adverse and significant adverse effects of noise.

### Noise Policy Statement for England, 2010

11.11 The Noise Policy Statement for England (NPSE) sets out the Government's overall policy on the management of all forms of noise, including environmental noise, neighbour noise and neighbourhood noise (but not noise in the workplace).

11.12 With respect to the potential onset of effects due to noise, it uses the established concepts of the No Observed Effect Level (NOEL) and Lowest Observed Adverse Effect Level (LOAEL), and extends these concepts by introducing the Significant Observed Adverse Effect Level (SOAEL), above which significant adverse effects on health and quality of life are likely to occur.

11.13 The NPSE states that it is not possible to identify a single objective value for SOAEL that is applicable to all sources of noise in all situations; it is likely to be different for different noise sources, for different types of receptors, and at different times. It is acknowledged that further research is required regarding the identification of different SOAELs, but that by not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance in available. Therefore, the practitioner must determine the appropriate SOAELs for a given situation, based on the available guidance.

11.14 The NPSE sets out the following long-term vision of noise policy and supporting aims:

*"Noise Policy Vision*

*Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

*Noise Policy Aims*

*Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life."*

11.15 The reference to considering noise in the context of government policy on sustainable development refers to a need to integrate consideration of the economic and social benefit of the potentially noise-generating activity under consideration with the likely environmental effects, including the impacts of noise.

11.16 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL; while these may be considered as adverse effects, they are not considered as significant. The NPSE asserts that, while all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.

### National Planning Guidance: Noise, 2019

11.17 The government has published guidance on how planning can manage potential noise impacts in new development. The guidance provides a range of advice as answers to common questions regarding the consideration of noise as part of the planning process.

11.18 Regarding how it can be established whether noise is likely to be a concern, the guidance includes a noise exposure hierarchy table that provides qualitative descriptions of the outcomes where noise is present with reference to the effect levels referred to in the NPSE, i.e., where noise is above the NOEL, LOAEL or SOAEL, as well as featuring the additional effect level of No Observed Adverse Effect Level (NOAEL) and a description of unacceptable adverse effects that should be prevented. This table is reproduced in full in Appendix 11.1.

11.19 The guidance confirms that adverse effects (between LOAEL and SOAEL) should be mitigated and reduced to a minimum, and significant adverse effects (above SOAEL) should be avoided, taking account of the economic and social benefit of the activity causing the noise. However, with respect to unacceptable effects, the resulting impacts on health and quality of life are such that, regardless of any benefits, the relevant noise must be prevented from occurring.

### Local Planning Policy

#### Manchester City Council Core Strategy, 2012

11.20 Manchester City Council's local policies regarding planning are defined within the Manchester Core Strategy.

11.21 In relation to noise, Policy DM 1 of the Core Strategy which deals with development management, states the following:

*"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."*

11.22 In relation to 'Leisure and the Evening Economy', Policy C 10 states the following:

*"New development and redevelopment that supports the evening economy, contributes to the vitality of district centres and supports a balanced and socially inclusive evening/night-time economy will be permitted, subject to the following considerations:*

- *Residential amenity – the proposed use should not create an unacceptable impact on neighbouring uses in terms of noise, traffic and disturbance".*

#### Manchester City Council: Planning and Noise Technical Guidance, 2022

11.23 Further guidance on Manchester City Council's approach to the consideration of noise in a planning context is provided within its technical guidance document "Planning and Noise".

11.24 The guidance provides advice on the application of relevant guidance and policy concerning the measurement, prediction, assessment and mitigation of environmental noise associated with a proposed development, as well as encouraging good acoustic design with the aspiration that new developments achieve the highest possible standards without compromising the health and well-being of people that live and work within the City of Manchester.

## Assessment Methodology and Significance Criteria

### Receptors

11.25 The receptors selected for this assessment comprise a sample of those closest to the Site. Their proximity means that, in general, impacts at other locations further from the relevant sources of noise and/or vibration would be no greater, and in most cases lower than those that have been assessed.

11.26 The sensitive receptors used for this assessment are listed in Table 11.1 below, together with details of what sources of noise have been considered at each location (note that changes in road traffic noise due to construction and operation of the Proposed Development have been considered based on the noise emission of the relevant roads themselves, rather than at receptors; further details are provided later in this section of the chapter). All the receptors are residential. The location of the receptors in the context of the Site is presented in Figure 11.1.

Table 11.1: Noise sensitive receptors considered for assessment

| Receptor ID | Receptor location | Sources considered (C, O)* |
|---|---|---|
| R1 | 6 Cromarty Walk (north facing façade) | C, O |
| R2 | 12 Biscay Close (north facing façade) | C, O |
| R3 | Ground Floor, 2b The Waterfront (The Cube), Gibbon Street | C, O |
| R4 | Top Floor, 2b The Waterfront (The Cube), Gibbon Street | C, O |
| R5 | Ground Floor, 2 Stuart Street (The Drum) | C, O |
| R6 | Top Floor, 2 Stuart Street (The Drum) | C, O |
| * C: Construction; O: Operational | | |

11.27 Receptors R1 and R2 are located to the south of the Site on the south side of Ashton New Road and represent the worst-affected residences in that area. The buildings are traditional 2-storey houses. For the daytime assessment, a point 1 m from the building façade at a height of 1.5 m above ground level has been used to represent ground (or ground floor) level. For any night-time assessments, a point 4.5 m above ground level has been used to represent first-floor bedroom windows.

11.28 The receptors R3-R4 and R5-R6 represent the multi-storey residential blocks 'The Cube' and 'The Drum' respectively. Potential effects have been assessed at separate receptors for ground floor level and for top floor level (25 m for The Cube and 27.5 m for the Drum) to give a clearer indication of the range of effects likely to be present across the various apartments they contain. All receptor points are located at the closest point on the building perimeter to the Site.

## Overview of Assessment Methodology

11.29 The potential effects of noise and vibration are assessed using different methods based on the type of source being considered using the relevant standards and guidance, as advised by national noise policy (see section on NPSE under Legislative and Policy Context above).

11.30 In some cases, such as construction noise and vibration, this involves the definition of a LOAEL, below which no adverse effects are expected but above which adverse effects are detectable, and a SOAEL, above which significant adverse effects expected to occur. In addition to exceeding the SOAEL, potential significance may also require consideration of other factors such as the duration of the exceedance.

11.31 However, where a type of noise is already part of an existing environment but is impacted by a development, for example road traffic noise, it can be more appropriate to use the magnitude of change in noise levels to indicate significance.

11.32 Following a review, the Proposed Development has the potential to result in noise effects from the following:

- Construction of the Proposed Development, including the associated construction road traffic (temporary);

- Changes in football matches, concerts and use of the existing/proposed fan zone areas associated with the reconfiguration of the stadium and its increased capacity;
- Changes in road traffic flows on the road network around the Proposed Development associated with its operation; and
- The installation of any new fixed plant.

11.33 Regarding vibration, it is possible that there may be some associated effects during the construction phase from certain activities.

11.34 The impact that climate change may have on the potential of noise and vibration effects has also been considered for both construction and operation of the Proposed Development.

11.35 Details of the assessment methodologies and identification of effects for the different sources of noise and vibration considered in the assessment are provided below.

## Temporary noise and vibration during construction

### On-site construction works

11.36 Construction noise from the key construction activities has been predicted at the receptors based on the methods described in BS 5228-1:2009+A1:2014 using information provided by the project team on construction activities and plant (see Appendix 11.2). Construction vibration has been considered with reference to BS 5228-2:2009+A1:2014 and the Design Manual for Roads and Bridges (DMRB).

11.37 To provide a succinct but comprehensive assessment of construction noise, the current construction programme has been reviewed and a selection of 'timeslices' have been identified. A timeslice represents a group of construction activities that take place at the same time. The selected timeslices represent the worst-case combinations of activities over the whole programme and therefore provide a robust assessment of the potential effects of construction noise. Currently, all works are planned take place during daytime hours.

11.38 Construction noise and vibration effect level thresholds have been based on those detailed in the same standards for the on-site construction activities, with the duration of any threshold exceedances also considered when determining significance. Although the concepts regarding LOAEL and SOAEL only specifically refer to noise exposure, it is helpful to adopt the same principles when assessing related potential vibration impacts and effects.

11.39 The criteria adopted for the assessment of temporary noise and vibration effects associated with on-site activities are detailed in Table 11.2 and Table 11.3 respectively.

Table 11.2: Effect level thresholds for construction noise

| Effect level [a] | Time period | Threshold value (dB $L_{Aeq,T}$) [b] |
|---|---|---|
| LOAEL (adverse) | Day (07:00 – 19:00) | >65 |
| | Evening (19.00 – 23.00) | >55 |
| | Night (23.00 – 07.00) | >45 |
| SOAEL (significant adverse) [a] | Day (07:00 – 19:00) | >75 |
| | Evening (19.00 – 23.00) | >65 |
| | Night (23.00 – 07.00) | >55 |
| *Notes:* | | |

| Effect level [a] | Time period | Threshold value (dB $L_{Aeq,T}$) [b] |
|---|---|---|
| *[a] Significant effects are expected to occur if the programme of works indicates that the relevant threshold values are likely to be exceeded over a period of at least one month.*<br>*[b] Values apply to a location one metre from a residential building façade containing a window, ignoring the effect of the acoustic reflection from that façade.* | | |

Table 11.3: Effect level thresholds for construction vibration

| Effect level | Threshold value (PPV, mm/s) [a] |
|---|---|
| LOAEL (adverse) | 0.3 |
| SOAEL (significant adverse) | 1.0 [b] |
| *Notes:*<br>*[a] This is the level at a residential receptor.*<br>*[b] Guidance in BS 5228-2:2009+A1:2014 states that this level of exposure can be tolerated by those affected if prior warning and explanation has been given. It goes on to state that a level of 10 mm/s is likely to be intolerable in most building environments for any more than a very brief exposure.*<br>*DMRB states that receptors would only normally be considered with respect to the potential effects of construction vibration if they are 100 m or less from the relevant construction activities; above this distance, no adverse effects would be expected.* | |

### Construction road traffic

11.40 Changes in road traffic noise due to construction traffic on the roads around the Site have been assessed by predicting the noise from scenarios both with and without the traffic associated with the construction of the Proposed Development using data provided by the project transport consultant (see Appendix 11.2) and comparing the results. The construction traffic includes both "light" vehicles and heavy vehicles such as lorries.

11.41 The basic noise level (BNL) for each relevant road has been calculated for both scenarios using the method described in the technical memorandum Calculation of Road Traffic Noise (CRTN) based on the currently estimated peak week of construction in 2024. The data includes all committed developments for this year.

11.42 The potential significance of any changes between the scenarios have been assessed based on the methodologies described in the Design Manual for Roads and Bridges (DMRB). For construction traffic noise, the assessment of significance has been based on the magnitude of the change in noise levels resulting from the addition of the vehicle movements associated with construction of the Proposed Development together with the duration of the impact, as follows:

Table 11.4: Impact magnitudes and significance criteria for construction road traffic noise

| Magnitude of impact | Increase in noise level due to construction road traffic (dB) |
|---|---|
| No change | No increase or decrease |
| Negligible | Less than 1.0 |
| Minor | Greater than or equal to 1.0 and less than 3.0 |
| Moderate | Greater than or equal to 3.0 and less than 5.0 |
| Major | Greater than or equal to 5.0 |
| *Identification of effect significance:*<br>*Significant effects are expected to occur if the programme of works indicates that either a moderate or major impact is expected over a period of at least one month.* | |

## Operational Noise

### Changes in noise associated with events: football matches, concerts, and fan zone

11.43 The stadium is currently used for large scale football matches and concerts. An existing fan zone is in the area to the north of the stadium that provides live entertainment and food and beverage services, primarily for the hours before and after a football match, though also for other events. Therefore, the noise associated with these sources is part of the existing noise climate in the area around the Site.

11.44 Changes in noise from the three primary elements associated with events (football match noise inside the stadium, concerts, and use of the existing and proposed fan zones) have been assessed by predicting the noise from scenarios both with and without the Proposed Development at the receptors using the method described in ISO 9613-2:1996 together with appropriate source levels and comparing the results. The predictions take the following into account:

- Football matches: noise generated within the stadium from the crowd and public address (PA) system, including pre-match announcements and music, crowd noise, and half-time entertainment, and the increase in capacity and changes in structural form as part of the Proposed Development;
- Concerts: noise generated within the stadium from a typical rock or pop concert sound reinforcement system with the main stage located at the north of the stadium pointing south and a level of 100 dB(A) at the front of house mixing position, and the changes in structural form as part of the Proposed Development; and
- Fan zone: noise generated by the main entertainment PA system within the fan zone, and changes in structural form as part of the Proposed Development which form barriers around the new fan zone (note that the new fan zone is in the same area on the north side of the stadium as the existing zone).

11.45 The predictions for the current scenario have been validated against measurements undertaken during the baseline noise survey (for football matches and use of the fan zone) and concert noise monitoring as far as possible.

11.46 The potential significance of any changes between the scenarios has been based on the magnitude of the change in noise levels for each of the three event noise types resulting from the Proposed Development, as follows:

Table 11.5: Impact magnitudes and significance categories for noise associated with events

| Magnitude of impact | Change in noise level (dB) | Significance of effect |
|---|---|---|
| No Change | 0 | Insignificant |
| Negligible | Up to 0.9 | |
| Minor | 1.0 – 2.9 | |
| Moderate | 3.0 – 4.9 | Significant |
| Major | 5.0 and above | |

11.47 For additional context, a qualitative assessment of the potential difference in effects from event noise has been undertaken comparing the Proposed Development with the scheme consented in 2014, which includes an expansion to the north stand with a similar increase in crowd capacity to the Proposed Development.

### Changes in road traffic noise (annual average)

11.48 Changes in road traffic noise due to operational traffic on the roads around the Site have been assessed by predicting the noise from scenarios both with and without the traffic associated with operation of the

Proposed Development using data provided by the project transport consultant (see Appendix 11.3) and comparing the results. The traffic includes both "light" vehicles and heavy vehicles such as lorries.

11.49 The basic noise level (BNL) for each relevant road has been calculated for both scenarios using the method described in the CRTN based on the annual average weekday traffic (AAWT) flow for the 18-hour period of 06:00 to 00:00 for the future year of 2026 when the Proposed Development is currently planned to be completed and fully operational. The data includes all committed developments for this year.

11.50 The operational traffic data relates to the change in annual average road traffic flows primarily associated with non-event uses including the new workspaces, hotel and club shop; it is understood that, on event days, roads in the area around the stadium already operate at capacity and therefore no material changes in traffic flows would be expected.

11.51 The potential significance of any changes between the scenarios have been assessed based on the methodologies described in the DMRB. For operational traffic noise, the assessment of significance has been based on the magnitude of the change in noise levels resulting from the addition of the vehicle movements associated with operation of the Proposed Development, as shown in Table 11.6.

Table 11.6: Impact magnitudes and significance criteria for operational road traffic noise

| Magnitude of Impact | Change in noise level (dB) | Significance of effect |
|---|---|---|
| No Change | 0 | Insignificant |
| Negligible | Up to 0.9 | |
| Minor | 1.0 – 2.9 | |
| Moderate | 3.0 – 4.9 | Significant |
| Major | 5.0 and above | |

### Changes in noise from use of new external fixed building services plant

11.52 As detailed in the Limitations and Assumptions section above, target noise levels for noise emissions from proposed external fixed building services plant have been specified based on the results of the baseline noise survey. Any new external fixed plant will be designed to achieve the target noise rating levels so that significant effects at the receptors will be avoided.

11.53 The selection of appropriate target noise levels is based on the guidance found in BS 4142:2014+A1:2019 and the Manchester City Council 'Planning & Noise: Technical Guidance' document. Target rating levels (dB $L_{Ar,Tr}$) for the noise emissions of any proposed external fixed plant have been specified as 5 dB below the existing typical background sound level (dB $L_{A90,15min}$) at each receptor, where the latter has been defined as the most frequently occurring measured level between the hours of 07:00 and 23:00 for the daytime period and 23:00 and 07:00 for the night-time period.

## Baseline Conditions

### Existing baseline

#### Baseline survey details

11.54 To characterise and quantify the existing baseline noise environment at the receptors considered in the assessment, a baseline noise survey was undertaken between Tuesday 1st November and Thursday 10th November 2022. The survey comprised two static monitoring locations and two locations where short-term attended measurements were undertaken.

11.55 The static monitoring locations were selected on the basis that they were close to the receptors, exposed to the same primary noise sources, and at similar distances from those sources. The attended monitoring was undertaken outside the receptor buildings to verify that the unattended positions were representative and to identify whether any corrections to the unattended data were required to account for the difference in locations.

11.56 A summary of the survey locations and other details are shown in Table 11.7 below. A plan showing the monitoring locations is presented in Figure 11.2.

Table 11.7: Details of attended and unattended noise monitoring undertaken

| Monitoring location details (U: unattended, A: attended) | | | Dates | Observations of main noise sources |
|---|---|---|---|---|
| L1 | U | North side of Ashton New Road, opposite Biscay Close & Cromarty Walk[1] | 01/11/22 – 10/11/22 | Road traffic noise from Ashton New Road dominant, occasional local plant noise audible |
| L2 | U | West side of Alan Turing Way, opposite The Cube[1] | 01/11/22 – 10/11/22 | Road traffic noise from Alan Turing Way dominant, occasional noise from Co-op Live arena construction site audible |
| S1 | A | Adjacent to north facing façade of 8 Biscay Close[2] | 10/11/22 | Road traffic noise from Ashton New Road dominant |
| S2 | A | Adjacent to south-west corner of The Cube[2] | 10/11/22 | Road traffic noise from Alan Turing Way dominant, occasional noise from Co-op Live arena construction site audible |

*[1] Measurements undertaken in acoustic free-field at a height of 2 m above ground level attached to fencing*
*[2] Measurements undertaken in acoustic free-field at a height of 1.5 m above ground level mounted on tripods*

11.57 The results of the unattended monitoring are presented in Appendix 11.4 as time history graphs. From the observations made while setting up/removing the unattended noise monitors, and while undertaking the attended monitoring, the dominant source of noise at all locations was road traffic from the adjacent roads, i.e., Ashton New Road at L1/S1 and Alan Turing Way at L2/S2. Local fixed external plant noise was audible on occasion at position L1, but this was judged to not significantly affect the measured noise levels; this was also the case with respect to noise from the Co-op Live arena construction site at positions L2 and S2.

11.58 Additional short-term attended measurements were undertaken in various locations during the UEFA Champions Leave match against Sevilla on the evening of Wednesday 2nd November and the Premier League match against Fulham on the afternoon of Saturday 5th November to verify the predictions of event noise (see previous section).

11.59 A field calibration check was undertaken prior to and following each set of measurements and no significant drift in sensitivity was noted at any location. All the sound level meters (SLMs) and field calibrators used for the survey met the requirements of a Class 1 instrument. All SLMs were within two years of their last laboratory calibration, and all calibrators within one year.

### Baseline survey results: typical background sound levels

11.60 For this assessment, the existing typical background sound levels (dB $L_{A90,T}$) at the receptors for the day (07:00 – 23:00) and night-time (23:00 – 07:00) periods are of primary importance. The typical background sound level has been defined as the most frequently occurring measured 15 minute level during the day and night-time periods, sometimes referred to as the modal value, following the guidance from BS 4142:2014+A1:2019. The unattended data has been statistically analysed to identify these levels for both monitoring positions.

11.61 In addition, data from a local weather station has been reviewed and any periods of adverse weather conditions that may have affect the measured noise levels (i.e., wind speeds above 5 m/s, significant precipitation) have been excluded from the analysis.

11.62 Finally, offsets have been applied to the data from the unattended monitoring positions where the attended monitoring indicated any differences in the noise levels outside the receptor buildings to ensure that the values presented are representative. The results are as shown in Table 11.8.

Table 11.8: Typical background sound levels at receptors

| Receptor | Typical background sound level (dB $L_{A90,15min}$)* | |
|---|---|---|
| | Daytime (07:00 – 23:00) | Night-time (23:00 – 07:00) |
| R1: 6 Cromarty Walk | 52 | 49 |
| R2: 12 Biscay Close | | |
| R3-R4: The Cube | 57 | 42 |
| R5-R6: The Drum | | |
| ** Typical background sound levels based on measurements undertaken at 2 m above ground level* | | |

### Future baseline

11.63 As detailed in Table 11.7 above, the existing baseline noise environment in the area around the Site is dominated primarily by road traffic noise; however, during events, the associated noise from within the stadium (e.g., crowd and PA addresses during football matches, amplified music during concerts, and amplified entertainment from operation of the fan zone) may dominate.

11.64 Assessment of the likely changes in road traffic noise and event noise as a result of the Proposed Development are detailed in the following section, but in summary, negligible increases in road traffic noise are expected, with, at worst, negligible increases in event noise, but also decreases, particularly with respect to noise from the fan zone due to new structures screening it from the surrounding area.

11.65 If the Proposed Development did not come forward, similar negligible increases in road traffic noise are expected due to increases in traffic flows for other reasons, and no changes in event noise are expected. It is understood that the Co-op Live arena is expected to result in negligible changes to the associated noise levels.

## Identification and Evaluation of Significant Effects

### Construction noise and vibration

#### On-site construction works

11.66 As discussed in the methodology section above, the potential significance of construction noise associated with the Proposed Development at the receptors has been assessed by comparing a selection of timeslices (groups of construction activities that take place at the same time) to the effect level thresholds. Following a review of the current construction programme, eight timeslices have been identified that represent the worst-case periods of construction noise that are expected to occur.

11.67 The predicted noise levels for the construction works at each receptor and the subsequent assessment are presented in Table 11.9 (see Appendix 11.2 and Appendix 11.5 for details of the timeslices and predicted noise levels for each individual activity respectively).

Table 11.9: Results of assessment of on-site construction noise

| Receptor | | Timeslice ID*: construction noise level (dB $L_{Aeq,T}$) | | | | | | | | No. of LOAEL exceedances | No. of SOAEL exceedances |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| R1 | 6 Cromarty Walk | 53 | 59 | 58 | 58 | 58 | 58 | 59 | 58 | None | None |
| R2 | 12 Biscay Close | 54 | 59 | 59 | 59 | 58 | 59 | 59 | 59 | None | None |
| R3/R4 | The Cube | 57 | 64 | 63 | 63 | 64 | 64 | 64 | 64 | None | None |
| R5/R6 | The Drum | 57 | 63 | 62 | 62 | 63 | 63 | 63 | 63 | None | None |
| ** Details of timeslices can be found in Appendix 11.2* | | | | | | | | | | | |

11.68 As can be seen in Table 11.9 above, none of the predicted construction noise levels exceed either the relevant LOAEL or SOAEL. The maximum predicted level is 64 dB(A) as predicted at R3/R4, the closest receptor to the Site, for several of the timeslices, and is primarily due to substructure and reinforced concrete frame works taking place at the new hotel building. Therefore, no significant effects or otherwise adverse effects are expected from on-site construction noise associated with the Proposed Development.

11.69 Regarding the potential significance of construction vibration associated with the Proposed Development at the receptors, following a review of the relevant construction activities and their locations within the site, the shortest distance between an activity and a receptor (R5/R6) is approximately 168 m. This is well over the minimum distance stated in Table 11.3 for which adverse effects might be expect at the receptor. Therefore, no significant effects or otherwise adverse effects are expected from on-site construction vibration associated with the Proposed Development.

### Construction road traffic

11.70 As discussed in the assessment methodology section above, the potential significance of any changes in road traffic noise due to construction traffic associated with the Proposed Development have been assessed by comparing future year traffic flow scenarios with and without the presence of the construction traffic. The future year is 2024 and is based on the week when the peak volume of construction traffic is expected.

11.71 The predicted changes in road traffic noise and the subsequent assessment are presented as follows (see Appendix 11.5 for the associated predicted noise levels for each road link and a figure showing the locations of the relevant road links):

Table 11.10: Results of assessment of construction road traffic noise

| Road link details | | Change in BNL (dB $L_{A10,18hr}$) | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 0.0 | No change | No |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 0.0 | No change | No |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 0.0 | No change | No |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 0.0 | No change | No |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | 0.0 | No change | No |

| Road link details | | Change in BNL (dB $L_{A10,18hr}$) | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 0.0 | No change | No |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 0.0 | No change | No |
| 12 | Gibbon Street East | 0.0 | No change | No |
| 13 | Stuart Street | 0.0 | No change | No |
| 14 | Welcomb Street | 0.0 | No change | No |
| 15 | A665/ Great Ancoats Street | 0.0 | No change | No |
| 17 | Bradford Road (West of Saxon Street) | 0.0 | No change | No |
| 18 | Briscoe Lane (west of Riverpark Road) | 0.0 | No change | No |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 0.0 | No change | No |
| 20 | A622 Ashton New Road (East of Linfield Street) | 0.0 | No change | No |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 0.0 | No change | No |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 0.0 | No change | No |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 0.0 | No change | No |

11.72 As can be seen in Table 11.10 above, all road links are predicted to have no increase in road traffic noise associated with construction traffic. Therefore, no significant effects are expected from road traffic noise associated with the Proposed Development.

### Climate change

11.73 Climate change has minimal direct effect on noise and vibration as a physical property; however, it can affect those things that generate noise and vibration.

11.74 Construction of the Proposed Development is currently planned to last until 2026. Although climate forecasts show that Manchester is expected to experience slightly increased temperatures, wetter winters and drier summers, no significant changes would be likely during the period of construction and therefore the current conditions are considered representative of those during construction.

11.75 On this basis, it is considered unlikely that climate change would lead to any changes in construction methodology or duration that would result in any significant changes to the likely impacts and effects of construction noise and vibration identified above.

## Operational noise

### Events

11.76 As discussed in the assessment methodology section above, the potential significance of any changes in event noise at the receptors as a result of the Proposed Development have been assessed by comparing scenarios with and without the associated changes. Noise has been considered from football matches, concerts, and use of the fan zone to the north of the stadium.

11.77 The predicted noise levels for each of the three types of event noise considered at each receptor together with the changes between the existing and proposed scenarios and the subsequent assessment are presented in the following tables, after which a discussion of the results is provided. Noise maps showing the predicted noise levels at a height of 1.5 m above ground level for each scenario in the area around the Proposed Development are presented in Figures 11.3 to 11.8.

Table 11.11: Results of assessment of event noise – football matches

| | Receptor | Match noise level (dB $L_{Aeq,T}$) | | | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|---|---|
| | | Existing | Proposed | Change | | |
| R1 | 6 Cromarty Walk | 64.4 | 65.2 | 0.8 | Negligible | No |
| R2 | 12 Biscay Close | 65.7 | 66.6 | 0.9 | Negligible | No |
| R3 | The Cube, Ground Floor | 66.0 | 65.1 | -0.9 | Negligible | No |
| R4 | The Cube, Top Floor | 69.9 | 68.5 | -1.4 | Minor beneficial | No |
| R5 | The Drum, Ground Floor | 64.4 | 63.8 | -2.6 | Minor beneficial | No |
| R6 | The Drum, Top Floor | 69.5 | 67.5 | -2.0 | Minor beneficial | No |

11.78 Regarding changes in football match noise due to the Proposed Development, it can be seen in Table 11.11 there are negligible increases predicted at receptors R1 and R2 to the south of the stadium because the north stand has increased in height and is open towards this area. Conversely, minor beneficial impacts are expected at R3-R6 to the north of the stadium due the greater height of the stand and the new buildings on this side providing a greater degree of screening in this direction. No significant effects are expected.

Table 11.12: Results of assessment of event noise – concerts

| | Receptor | Concert noise level (dB $L_{Aeq,T}$) | | | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|---|---|
| | | Existing | Proposed | Change | | |
| R1 | 6 Cromarty Walk | 67.2 | 67.2 | 0.0 | No change | No |
| R2 | 12 Biscay Close | 68.5 | 68.5 | 0.0 | No change | No |
| R3 | The Cube, Ground Floor | 57.8 | 57.8 | 0.0 | No change | No |
| R4 | The Cube, Top Floor | 62.2 | 62.1 | -0.1 | Negligible | No |
| R5 | The Drum, Ground Floor | 58.2 | 55.2 | -3.0 | Moderate beneficial | Yes |
| R6 | The Drum, Top Floor | 60.8 | 58.2 | -2.6 | Minor Beneficial | No |

11.79 Regarding changes in concert noise due to the Proposed Development, it can be seen in Table 11.12 that there is little to no change in the predicted levels at R1 and R2 to the south of the stadium, and R3-R4 to the north-east. This is because the primary paths that the concert noise from the sound reinforcement system take to arrive at these receptors are largely unchanged. However, at R5 and R6, the increased height of the stand and new buildings at the north of the stadium do provide additional screening, leading to minor to moderate beneficial impacts, the latter being considered a significant effect.

Table 11.13: Results of assessment of event noise – fan zone

| Receptor | Fan zone noise level (dB $L_{Aeq,T}$) | | | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|---|
| | Existing | Proposed | Change | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| R 1 | 6 Cromarty Walk | 30.6 | 27.6 | -3.0 | Major beneficial | Yes |
| R 2 | 12 Biscay Close | 31.1 | 26.7 | -4.4 | Major beneficial | Yes |
| R 3 | The Cube, Ground Floor | 55.4 | 35.9 | -19.5 | Major beneficial | Yes |
| R 4 | The Cube, Top Floor | 56.7 | 36.5 | -20.2 | Major beneficial | Yes |
| R 5 | The Drum, Ground Floor | 58.7 | 39.0 | -19.7 | Major beneficial | Yes |
| R 6 | The Drum, Top Floor | 58.9 | 39.6 | -19.3 | Major beneficial | Yes |

11.80 Regarding changes in fan zone noise due to the Proposed Development, it can be seen in Table 11.13 that there are major beneficial impacts at all receptors, particularly those to the north-east of the stadium that have a clearer line to the north of the stadium, due to the new buildings which form barriers around the fan zone area. These are all considered to be significant effects.

### Road traffic (annual average)

11.81 As discussed in the assessment methodology section above, the potential significance of any changes in road traffic noise as a result of the Proposed Development have been assessed by comparing future year traffic flow scenarios with and without the presence of traffic associated with its operation. The future year is 2026 when the Proposed Development is currently planned to be completed and fully operational.

11.82 The predicted changes in road traffic noise and the subsequent assessment are presented as follows (see Appendix 11.6 for the associated data and a figure showing the locations of the relevant road links):

Table 11.14: Results of assessment of operational road traffic noise

| Road link details | | Change in BNL (dB $L_{A10,18hr}$) | Magnitude of impact | Significant effect indicated? |
|---|---|---|---|---|
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 0.1 | Negligible | No |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 0.1 | Negligible | No |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 0.1 | Negligible | No |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 0.0 | No change | No |
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 0.0 | No change | No |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 0.0 | No change | No |
| 12 | Gibbon Street East | 0.0 | No change | No |
| 13 | Stuart Street | 0.0 | No change | No |
| 14 | Welcomb Street | 0.0 | No change | No |
| 15 | A665/ Great Ancoats Street | 0.0 | No change | No |
| 17 | Bradford Road (West of Saxon Street) | 0.0 | No change | No |
| 18 | Briscoe Lane (west of Riverpark Road) | 0.0 | No change | No |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 0.0 | No change | No |
| 20 | A622 Ashton New Road (East of Linfield Street) | 0.0 | No change | No |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 0.0 | No change | No |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 0.0 | No change | No |

| | | | | |
|---|---|---|---|---|
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 0.0 | No change | No |

11.83 As can be seen in Table 11.14 above, only three road links representing different sections of Alan Turing Way show a predicted increase in road traffic noise, and they are all the lowest increase possible and therefore represent negligible impacts. All other roads are predicted to have no increase in road traffic noise. Therefore, no significant effects are expected from road traffic noise associated with the Proposed Development.

### External fixed building services plant

11.84 As discussed in the assessment methodology section, target noise rating levels for noise emissions from proposed external fixed building services plant have been specified at the receptors based on the results of the baseline noise survey, set at 5 dB below the existing typical background sound levels presented in Table 11.8, as follows:

Table 11.15: Target noise levels for external fixed plant at receptors

| Receptor | Target plant noise rating level (dB $L_{Ar,Tr}$)* | |
|---|---|---|
| | Daytime (07:00 – 23:00), Tr = 1 hr | Night-time (23:00 – 07:00), Tr = 15 mins |
| R1: 6 Cromarty Walk | 47 | 44 |
| R2: 12 Biscay Close | | |
| R3-R4: The Cube | 52 | 37 |
| R5-R6: The Drum | | |
| ** Typical background sound levels based on measurements undertaken at 2 m above ground level* | | |

11.85 The levels stated in Table 11.15 are rating levels as defined by BS 4142:2014+A1:2019. They apply to the specific noise from the fixed plant with any corrections added on to account for the certain acoustic characteristics, if present at the receptors, that have the potential to increase the associated impact. These include tonality, impulsivity, and intermittency. It should be noted that the target levels apply to the cumulative noise emissions from all new fixed plant associated with the Proposed Development. The target levels apply to the peak 1 hour period of plant operation during the day, and the peak 15 minute period during the night.

11.86 Any new external fixed plant installations will be sited and designed to achieve the target noise rating levels. Where necessary, this may include employing standard measures such as screening or enclosures around the fixed plant, or attenuators attached to any intakes or exhausts. This will be confirmed and implemented at the detailed design stage. On this basis, no adverse impacts or significant effects are expected from this source.

### Climate Change

11.87 Climate change has minimal direct effect on noise and vibration as a physical property; however, it can affect those things that generate noise and vibration.

11.88 The Proposed Development is expected to be completed and fully operational by 2026. Climate forecasts looking beyond this time predict that by 2080, the north-west of England will likely experience approximately 30% more precipitation during the winter, increasing the risk of flooding, and 30% less during summers, as well as potential temperature increases of up to 3-4 °C in the winter and 4-5 °C in the summer.

11.89 More extreme weather conditions may lead to increased use of car trips, though this is unlikely to lead to a significant increase in road traffic noise. Similarly, changes in climate may lead to increased use of cooling and heating systems and increases in the associated external fixed plant noise. However, as the target plant noise levels specified above are to be achieved during the peak periods of expected plant usage, it is unlikely any increased use of external fixed plant would result in significant increases in plant noise.

11.90 On this basis, it is considered unlikely that climate change would result in any significant changes to the likely impacts and effects of operational noise identified above.

## 2014 Extant Consent

11.91 There is an extant planning consent for the modification of the stadium, approved in 2014. This included options for expanding both the north and south stands, or the south stand only. While both options were approved, only the south stand was altered following the consent.

11.92 The expansion of the north stand covered by the extant consent is similar in size and additional capacity to what is included in the Proposed Development. On this basis, with respect to football match and concert event noise, the previously consented scheme would likely result in similar impacts and effects to those presented in this chapter.

11.93 Regarding event noise from the fan zone, the 2014 consented scheme did not include additional buildings to the north of the stadium, as per the Proposed Development. These are predicted to add a considerable amount of screening around the new fan zone and result in major beneficial impacts in terms of the resulting noise at receptors, as detailed above. In this respect therefore, the Proposed Development is predicted to provide beneficial impacts that were not present with the 2014 scheme.

## Mitigation Measures

### Construction noise and vibration

11.94 No significant or otherwise adverse effects are expected from construction noise or vibration associated with the Proposed Development; therefore, no specific mitigation measures are likely to be required.

11.95 However, construction noise and vibration will be mitigated and minimised using the principle of best practicable means (BPM). These measures will include the selection of quieter items of plant and equipment, the use low of low noise methodologies, and implementation of boundary hoarding and localised screening around noisier activities where possible. A Construction Management Plan will be submitted to MCC before the works begin that gives further details on the mitigation options to be used.

### Operational noise

11.96 No significant or otherwise adverse effects are expected from operational noise associated with the Proposed Development; therefore, no specific mitigation measures are likely to be required.

11.97 As detailed above, target noise levels at receptors have been defined for noise emissions from external fixed building services plant. To achieve these, measures such as the use of screening or enclosures around the fixed plant, or attenuators attached to any intakes or exhausts may be required. This will be confirmed and implemented at the detailed design stage.

## Cumulative Effects

11.98 All the committed developments are at least 500 m from the Proposed Development. Therefore, in terms of potential cumulative effects with respect to the other developments, no additional impacts or effects are expected to occur in terms of noise and vibration generated from within the Site (i.e., from construction, events, or external fixed plant).

11.99 With respect to both construction and operational road traffic noise, the data used for these assessments includes traffic flows associated with committed developments; therefore, any potential cumulative effects have already been considered in the main assessment.

## Residual Effects

11.100 No significant or otherwise adverse residual effects are expected from either construction noise and vibration or operational noise associated with the Proposed Development at any receptor.

11.101 The Proposed Development is predicted to result in significant beneficial residual effects due to the reduction of event noise from use of the fan zone at the north of the stadium and from concerts. In both cases, this is due to the increased screening from the new structures to be constructed.

## Reference List

11.102 This ES Chapter has been prepared by reference to the following:


- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open Sites – Part 1: Noise'
- BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open Sites – Part 2: Vibration'
- Calculation of Road Traffic Noise, Department of Transport (1988)
- ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'
- LA 111 version 2, Design Manual for Roads and Bridges, National Highways (2020)
- Manchester Core Strategy 2012 to 2027, Manchester City Council (2012)
- National Planning Guidance: Noise, Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2019)
- National Planning Policy Framework, Ministry of Housing, Communities & Local Government (2021)
- Noise Policy Statement for England, Department for Environment, Food & Rural Affairs (2010)
- Planning and Noise: Technical Guidance, Manchester City Council (2022)

## Figures

Figure 11.1: Locations of receptors used for assessment



Figure 11.2: Locations of noise monitoring positions




| | |
|---|---|
| Figure | 11.2 |
| Title | Locations of noise monitoring positions |
| Scale | NTS |

Figure 11.3: Event noise predictions: existing football match (noise levels at height of 1.5 m)

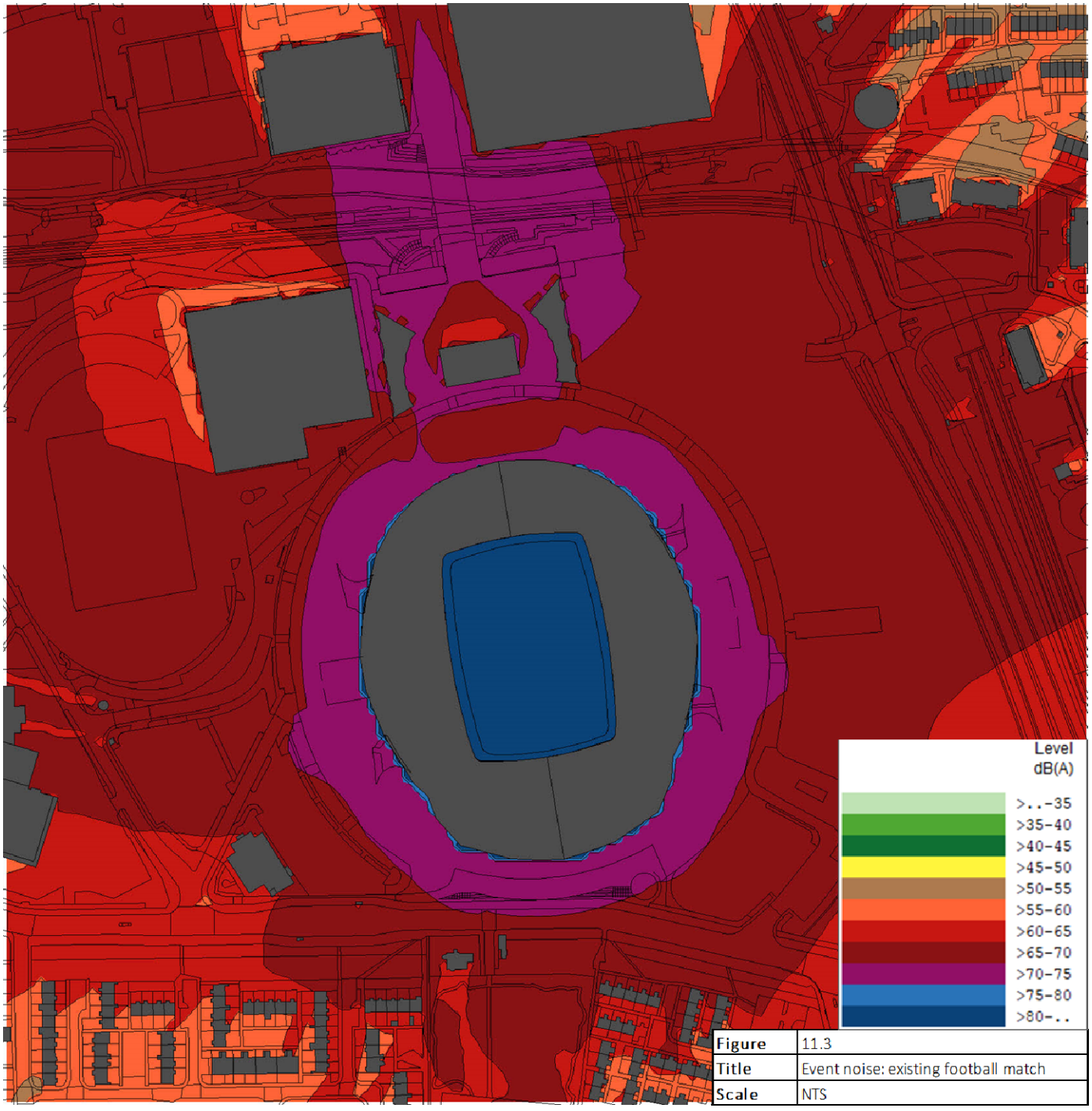
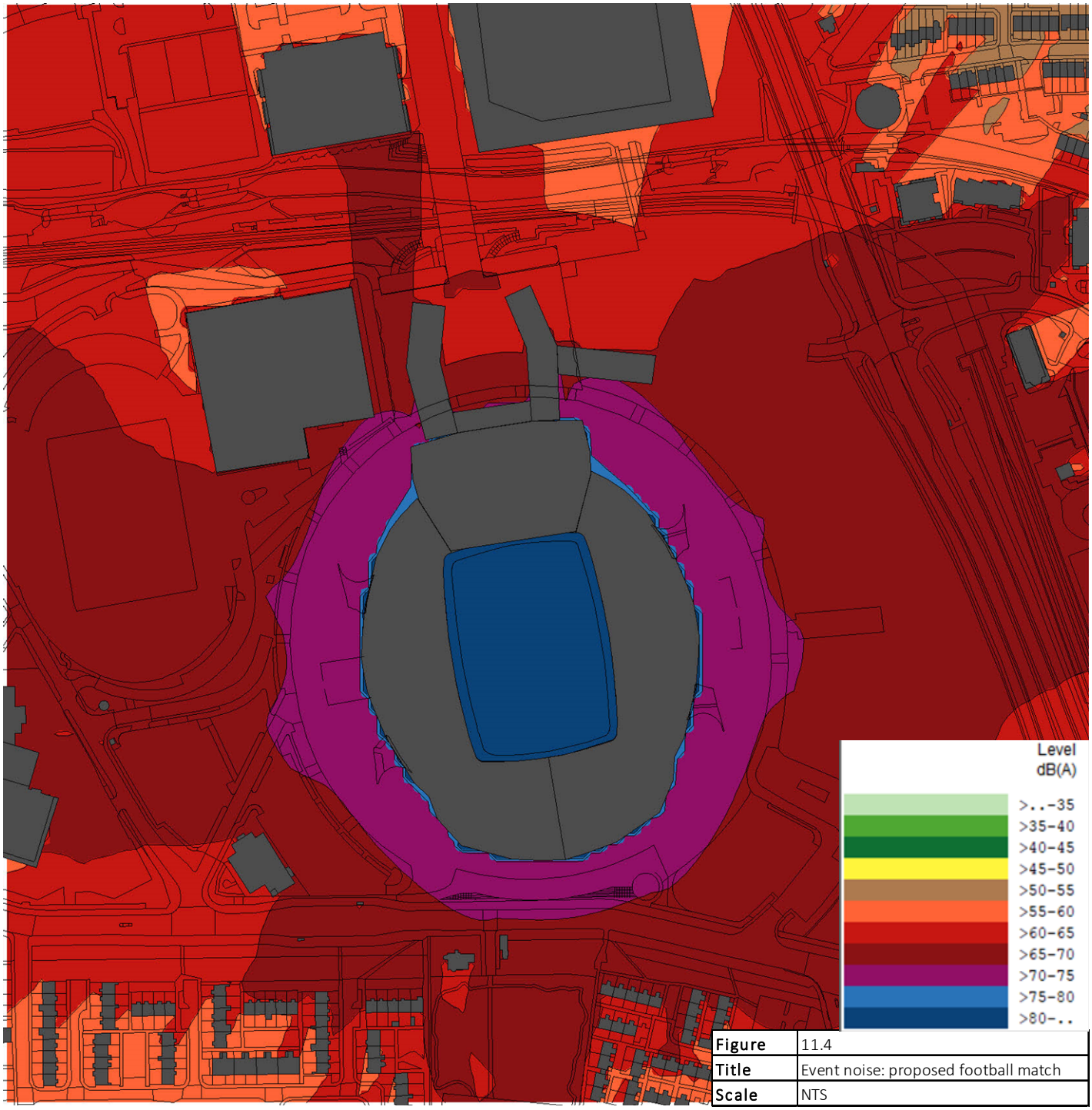
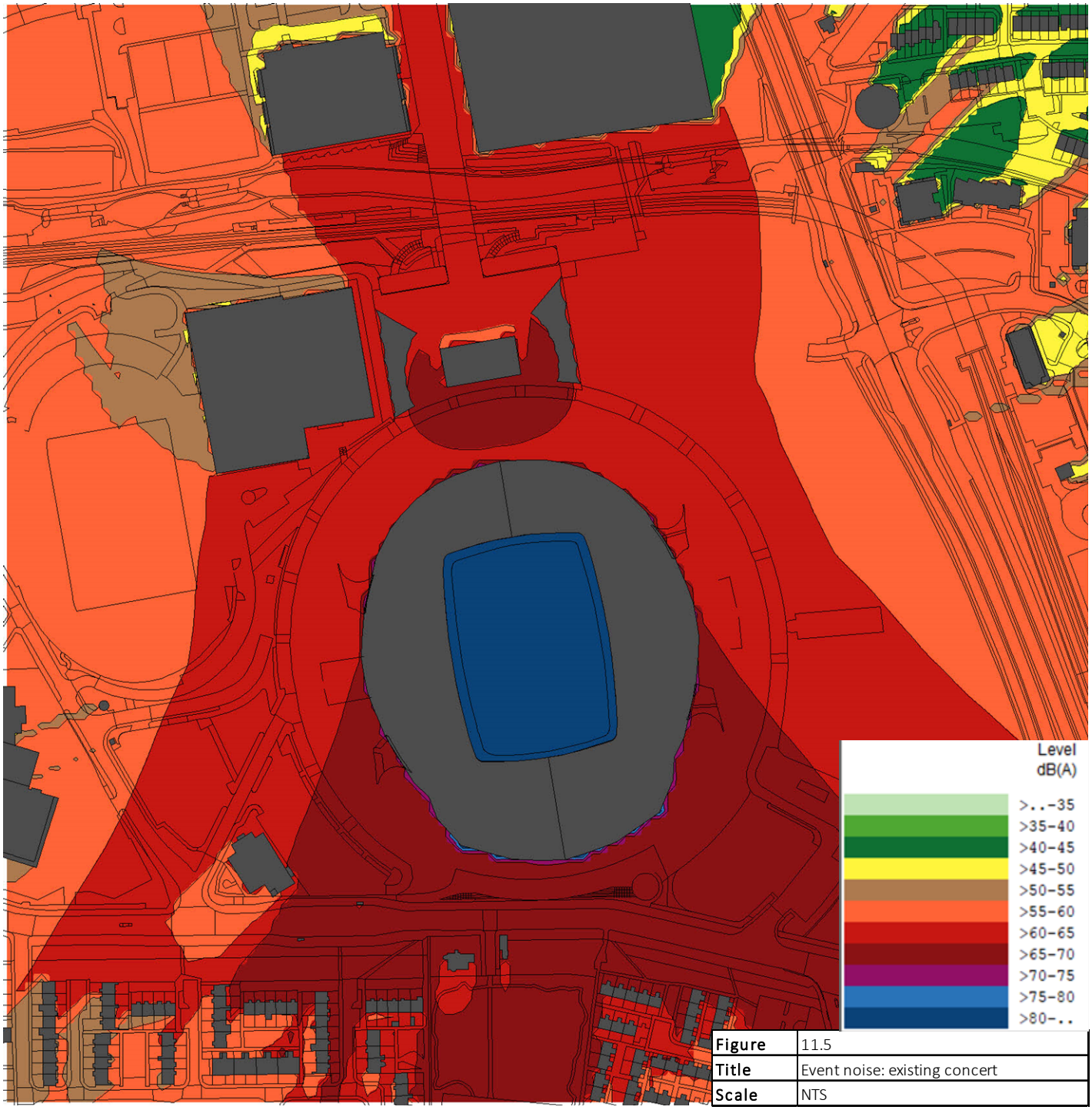


Figure 11.4: Event noise predictions: proposed football match (noise levels at height of 1.5 m)



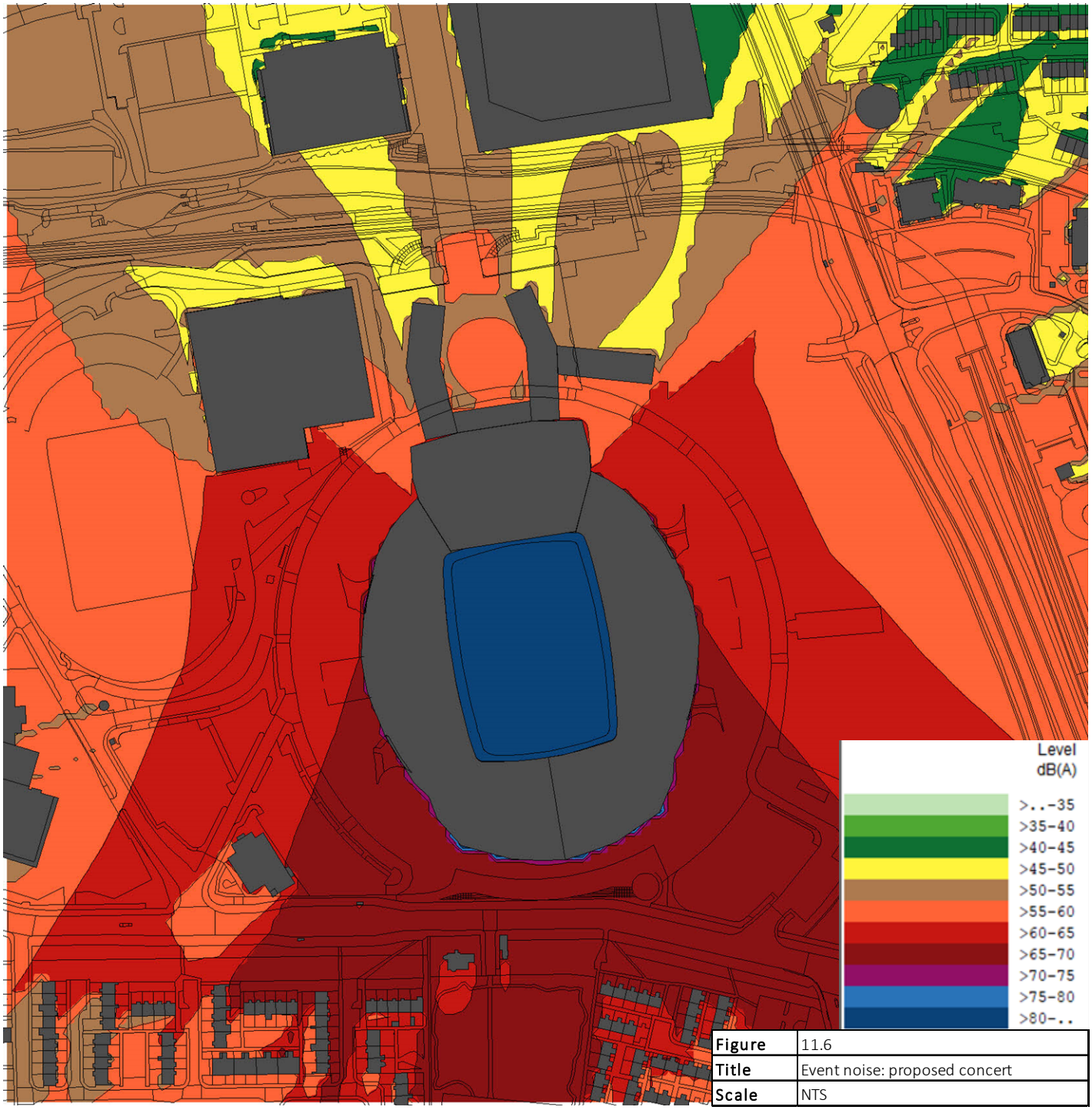

| | |
|---|---|
| Figure | 11.4 |
| Title | Event noise: proposed football match |
| Scale | NTS |

Figure 11.5: Event noise predictions: existing concert (noise levels at height of 1.5 m)



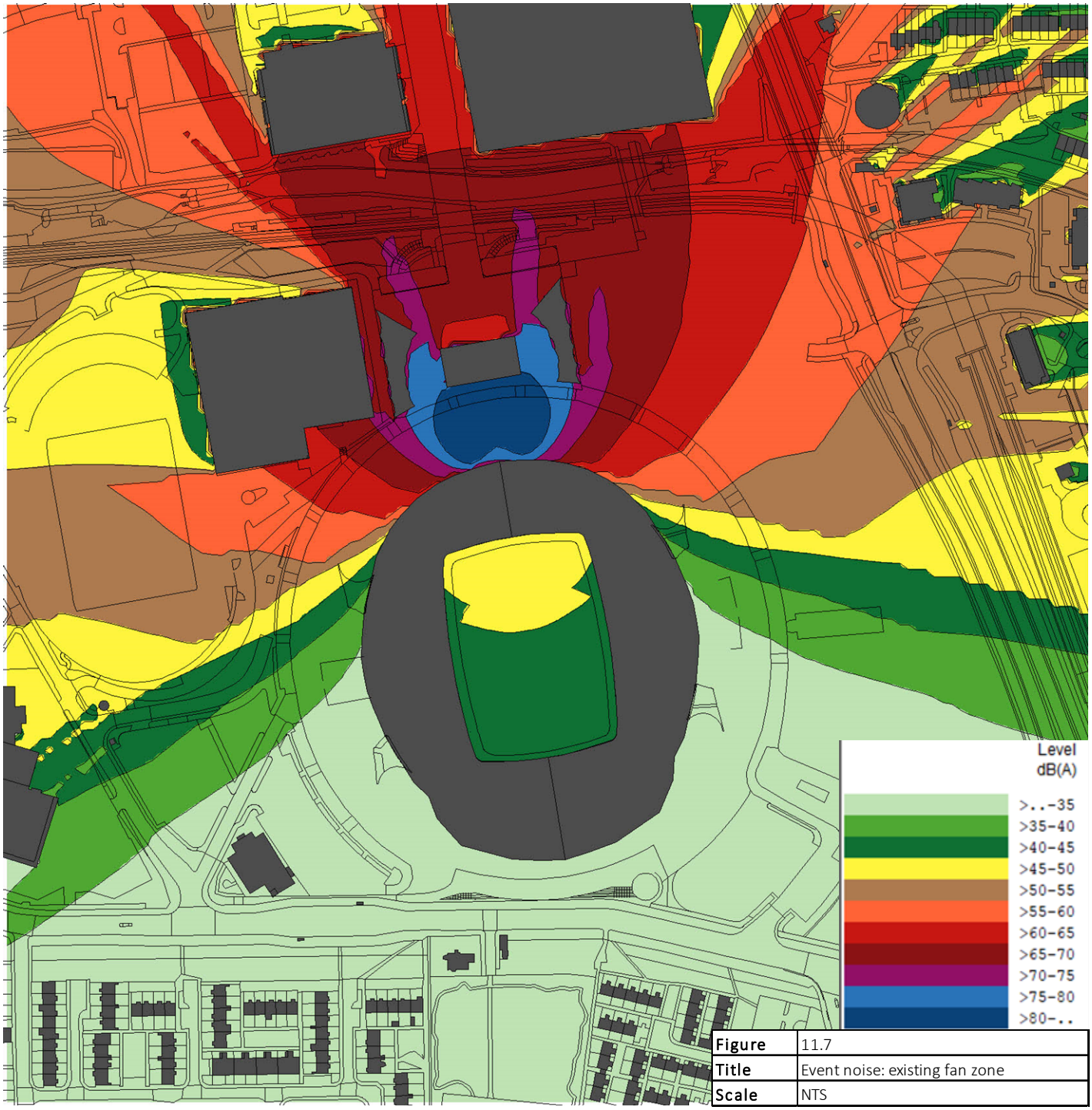

| | |
|---|---|
| Figure | 11.5 |
| Title | Event noise: existing concert |
| Scale | NTS |

Figure 11.6: Event noise predictions: proposed concert (noise levels at height of 1.5 m)



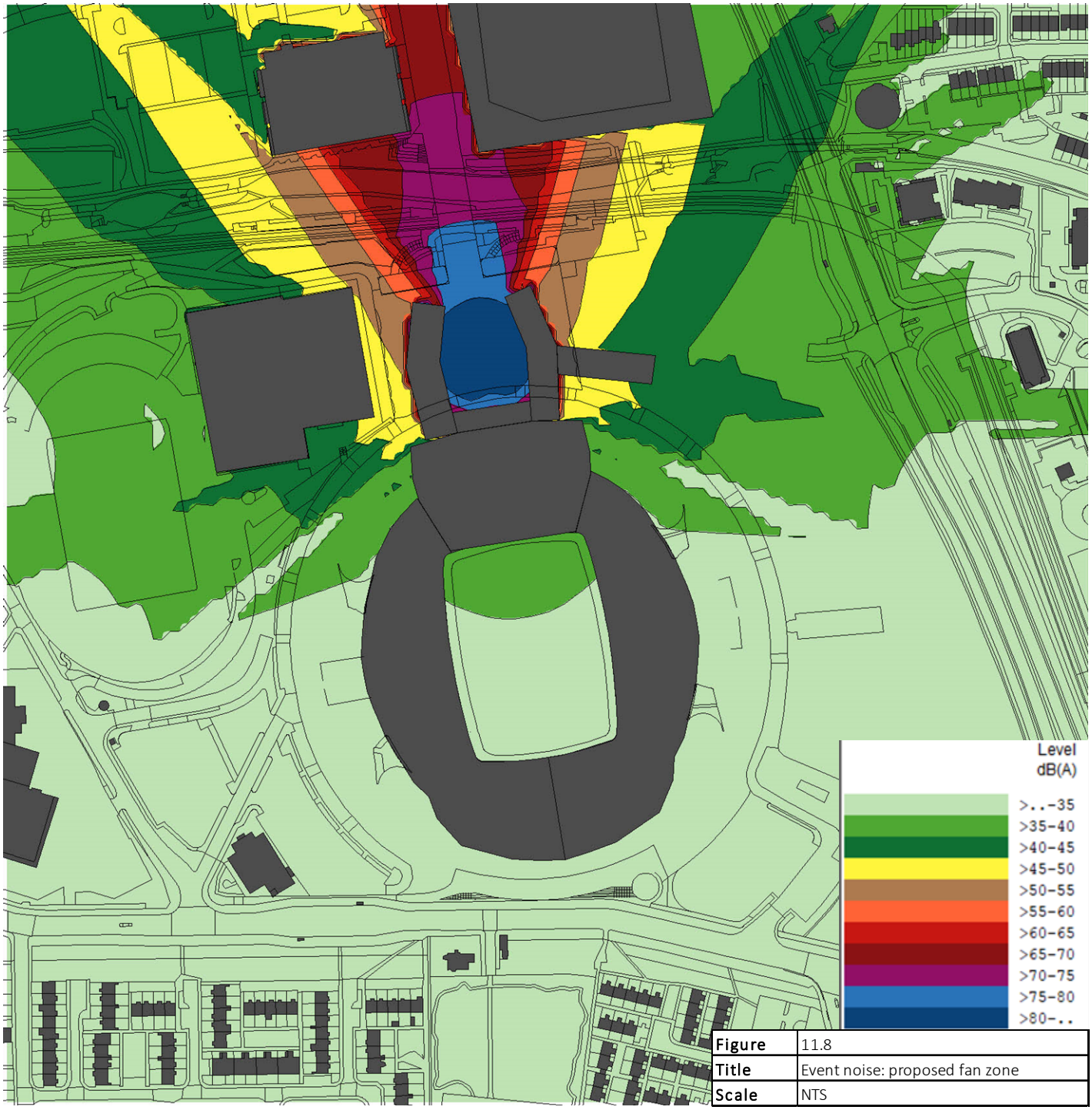

| | |
|---|---|
| Figure | 11.6 |
| Title | Event noise: proposed concert |
| Scale | NTS |

Figure 11.7: Event noise predictions: existing fan zone (noise levels at height of 1.5 m)




| | |
|---|---|
| Figure | 11.7 |
| Title | Event noise: existing fan zone |
| Scale | NTS |

Figure 11.8: Event noise predictions: proposed fan zone (noise levels at height of 1.5 m)




| | |
|---|---|
| Figure | 11.8 |
| Title | Event noise: proposed fan zone |
| Scale | NTS |

# 12. Townscape and Visual Impact

## Introduction

12.1. This Chapter of the ES has been prepared by Planit-IE Ltd and assesses the likely Townscape and Visual impacts of the proposals upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

12.2. This Chapter is accompanied by four technical appendices; Townscape baseline and Assessment table Appendix 12.1, Visual Baseline and Assessment table Appendix 12.2, Figures Appendix 12.3 and, Views and Photomontages Appendix 12.4.

| | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | John Willerton | Gillian Webb |
| Company | Planit IE Limited | Planit IE Limited |
| Qualifications/Accreditations relevant to technical area | BA(Hons), Chartered Member of the Landscape Institute CMLI | MA, Chartered Member of the Landscape Institute CMLI |
| Does the practitioner hold any IEMA qualification? | no | no |
| Company hold IEMA QMark? | no | |
| Years technical experience (in technical area) | 15 years | 15 years |
| Number of EIA's delivered to date | 15+ | 15+ |

## Limitations and Assumptions

12.3. The methodology described within this assessment provides a robust and transparent process for assessment of townscape and visual effects. Production of verified photomontage views provides a high level of detail and technical accuracy. The TVIA process is based on the GLVIA guidelines, and the assessment has been presented in a tabular format in Appendices 12.1 and 12.2. The assessment is carried out by a team of assessors to provide scrutiny where professional judgement is relied upon.

12.4. Verified views have been produced to provide a high level of confidence in the assessment of effects resulting from the Proposed Development.

12.5. Due to the timing of the application, the photography and assessment has been carried out during the autumn months of 2022 when the trees are still partially in leaf. The potential screening effects of trees has been taken into account during the assessment of visual impact, in order to ensure assessment of 'worst case' scenario, in accordance with the Guidelines.

12.6. The cumulative visual assessment does give a clear indication which of the key viewpoints and townscape receptors are likely to be impacted on by committed development.

12.7. Acknowledging the limitations and assumptions, predicted effects are assessed against the criteria set out below in order to attribute a level of confidence to the assessment:

- High – The predicted effect is either certain, or very likely to occur, based on reliable information or previous experience.
- Medium – The predicted effect and its level are best estimates, based on on-site and desktop study.
- Low – The predicted effect and its level are best estimates, based on given knowledge and experience. More information may be needed to improve the level of confidence.

## Legislation

12.8. The European Landscape Convention (ELC, 2000) provides a foundation for closer co-operation on landscape issues across Europe and was ratified in the UK on the 21 November 2006, and became binding on 1 March 2007. The convention identifies the need to recognise landscape in law, to develop and promote landscape policies dedicated to the protection, management and creation of landscapes, and to establish procedures for the participation of the general public and other stakeholders in the evolution and implementation of landscape policies. It also encourages the integration of landscape into all relevant areas of policy, including cultural, economic and social policies.

12.9. The ELC defines landscape as '*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'*. It recognises that landscape has important cultural, ecological, environmental and social dimensions and is a key element of achieving sustainable development. In this context the use of the word 'landscape' is more appropriately termed 'townscape' though the constituent factors remain consistent.

### National Planning Policy

12.10. The National Planning Policy Framework was updated in July 2021 and sets out the government's planning policies for England and how these are expected to be applied.

12.11. The purpose of the planning system is to contribute to the achievement of sustainable development through three overarching objectives:

- An economic objective - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- A social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and,
- An environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

12.12. The environmental objective is of particular relevance to the purpose of townscape and visual impact assessment.

12.13. Section 12 of the NPPF deals with the requirements of good design. The overarching principle is set out in paragraph 126, which state, "the creation of high quality buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities."

12.14. Paragraph 130 of the NPPF sets out a number of principals of good design. In order to accord with these principles, it should be ensured that new developments:

- will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;
- are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;
- are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);
- establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;
- optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and,
- create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.

12.15. Section 16 of the NPPF concerns conserving and enhancing the historic environment. Paragraph 189 states that heritage assets are, "an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations".

12.16. Whilst the site is not located in a Conservation Area and does not contain listed buildings, heritage is an intrinsic part of townscape assessment and potential views from Conservation Areas and the context around listed buildings and parks have been considered as part of the assessment. There is also an overarching desirability set out within the NPPF for new development to contribute positively to local character and distinctiveness.

### *Guidance*

12.17. The following guidance has been used in the assessment;

- Guidelines for Landscape & Visual Impact Assessment, 3rd Edition, 2013;
- Planning Practice Guidance; and
- IEMA Environmental Impact Assessment Guide to Shaping Quality Development, 2015.
- Historic England Advice Note 4 Tall Buildings.

## Local Planning Policy

Manchester's Local Development Framework, Core Strategy Development Plan Document (2012)

12.18. Manchester's Core Strategy was adopted in July 2012. Relevant policies from the Strategy for the purposes of this chapter are outlined below.

Policy EN1 Design Principles and Strategic Character Areas

12.19. All development in Manchester will be expected to follow the seven principles of urban design, as identified in national planning guidance and listed above and have regard to the strategic character area in which the development is located. Opportunities for good design to enhance the overall image of the City should be fully realised, particularly on major radial and orbital road and rail routes.

Policy EN3 Heritage

12.20. "Throughout the City, the Council will encourage development that complements and takes advantage of the distinct historic and heritage features of its districts and neighbourhoods"

12.21. New developments must be designed so as to support the Council in preserving or, where possible, enhancing the historic environment, the character, setting and accessibility of areas and buildings of acknowledged importance, including scheduled ancient monuments, listed buildings, registered parks and gardens, conservation areas and archaeological remains.

12.22. Proposals which enable the re-use of heritage assets will be encouraged where they are considered consistent with the significance of the heritage asset.

Policy EC5 East Manchester

12.23. East Manchester is expected to provide approximately 80-85ha of employment land. The majority of this provision will be within the Regional Centre, specifically:

- Central Park (see policy EC6), B1, B2;
- Eastlands (see policy EC7), a major leisure visitor destination with ancillary retail and offices.
- City Centre Fringe (see policy CC1) along Great Ancoats Street, providing an extension to City Centre employment opportunities;

12.24. Development will also be supported in existing employment and economic development areas, including Alan Turing Way, along key radial routes and Ardwick Goods Yards.

12.25. The Council will promote development which:

- Ensures major employment opportunities are connected via non-car modes to residential neighbourhoods within East Manchester and North Manchester, these include the City Centre, Central Park, Eastlands and railway stations in the City Centre.
- Takes advantage of key transport infrastructure such as the arterial roads (Oldham Road, Ashton New Road, Ashton Old Road and Hyde Road) and public transport networks, such as bus routes and the proposed extension to Metrolink including two new lines and new stops; creates links to the Rochdale and Ashton Canals and links to the open space network including the Rochdale and Ashton Canals and the Medlock Valley, providing opportunities for walking and cycling to economic development opportunities;.
- Has regard to listed buildings and conservation areas including Ancoats and the industrial heritage of the area.

Policy EN9 Green Infrastructure

12.26. New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises and in accordance with current Green Infrastructure Strategies the Council will encourage developers to enhance the quality and quantity of

green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure. Where the benefits of a proposed development are considered to outweigh the loss of an existing element of green infrastructure, the developer will be required to demonstrate how this loss will be mitigated in terms of quantity, quality, function and future management.

12.27. The Council will seek to protect existing street trees and promote new planting, particularly where this can enhance green links in the urban area.

12.28. The provision of new, and improvements to the quality and accessibility of existing green infrastructure assets, to mitigate for any loss of green infrastructure.

Policy DM1 Development Management

12.29. All new developments should follow the 'Development Principles' and accord with the design guidance set out in the Supplementary Planning Documents. The key principle of relevance to this assessment is defined as follows:

- Appropriate siting, layout, scale, form, massing, materials and detail. Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.

Guide to Development in Manchester SPD (2007)

12.30. In accordance with the Guide to Development in Manchester SPD, development in Manchester will be expected to follow the seven design principles set out below:

- Character: a place with its own identity.
- Continuity and enclosure: a place where public and private places are clearly distinguished.
- Quality of the public realm: a place with attractive, and successful outdoor areas.
- Ease of movement: a place that is easy to get to and move through.
- Legibility: a place that has a clear image and is easy to understand.
- Adaptability: a place that can change easily.
- Diversity: a place with variety and choice.

Eastlands Regeneration Framework – (2017)

12.31. The Site is located centrally within the boundary of the Eastlands Regeneration Framework.

12.32. The Site is located adjacent to the 'Etihad Campus Commercial Zone' and Etihad Sports and Innovation Zone'.

## Assessment Methodology and Significance Criteria

12.33. This assessment has been carried out with reference to the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, 2013 (referred to hereafter as "the Guidelines") by Planit-IE Ltd, a registered practice of the Landscape Institute with considerable experience in landscape and visual assessment.

12.34. A three-stage assessment process has been adopted. Firstly, the nature of receptors (sensitivity) has been assessed, and secondly, the nature of effects (magnitude) likely to result from the proposed development has been assessment. From this, the overall significance of the identified effects on receptors have been assessed.

12.35. The methodology is collated into a tabulated format where possible to provide structure for a consistent and methodical approach. Criteria and justifications are recorded in **Appendix 12.1 and 12.2** for transparency. The overall assessment of significance has regard to paragraph 5.56, page 92 (significance of landscape effects) and paragraph 6.44, page 116 (significance of visual effects) of the Guidelines.

12.36. The study area for this assessment is illustrated in **Figure 12.3.1** in **Appendix 12.3**. The assessment has considered the Proposed Development within the wider city context.

12.37. The following testing scenarios have been considered within this assessment:

- Scenario 1 – baseline as existing today with committed developments;
- Scenario 2 – baseline as 2014 extant consent (qualitative assessment);
- Scenario 3 – baseline plus Proposed North Stand development; and,
- Scenario 4 – baseline plus Proposed North Stand development and mitigation.

12.38. Desk based studies were carried out to collate and map baseline townscape information and carry out a review of policy and guidance to inform the assessment.

12.39. Potential viewpoints were initially identified through a process of desktop and onsite survey before being checked on site. Viewpoints were excluded where there was likely to be no significant impact beyond that which was already identified within the selected views.

12.40. Photographs for the selected viewpoints were taken by a professional photographer on the 29th October 2022. The visualisations were produced by Virtual Planit, a professional visualisation studio with extensive experience in the production of photomontages. The photography and visualisations were both produced to accord with best practice, in accordance with the Landscape Institute technical guidance note, "Visual Representation of Development Proposals', September 2019.

12.41. In order to provide the most comprehensive, rounded and objective view of the Townscape and Visual Impacts of the Proposed Development, assessed effects have been agreed following round-table review by a team of individual assessors.

## Criteria for Determining Sensitivity of Visual Receptors

12.42. Townscapes may be valued at community, local, national level or above. Existing Townscape designations have been taken as the starting point for this assessment, as shown in **Table 12.1** below. However, the value attached to undesignated townscapes also needs to be assessed and this is considered in **Table 12.2.**

12.43. **Table 12.1** sets out the relative importance of generic townscape designations and descriptions.

Table 12.1: Value of Designated Townscapes

| Value | Description |
|---|---|
| High | Sites, features or areas of national or international importance with settings of high quality such as World Heritage Site, AONB, National Parks, Grade I and Grade II* Listed buildings or Registered Parks and Gardens. |
| Medium | Sites, features or areas of local or regional importance with intact character such as Grade II* and Grade II Listed Buildings or Registered Parks and Gardens, Conservation Areas, Scheduled Monuments, local nature site, long distance recreational routes. Tree Preservation Orders (TPO) and local designations that exhibit wider geographic, cultural or townscape significance. |

| | |
|---|---|
| Low | Areas or features of local importance such as Tree Preservation Orders (TPO), Public Right of Way (PROW) and locally listed buildings. |

12.44. Whilst the assessment of value is partly based on the Planning Policy importance of the townscape, other criteria used to assess townscape value in more detail, including that of undesignated townscape, are set out in Table 11.2 below. The criteria are taken from the Planning Practice Guidance that supports the National Planning Policy Framework.

Table 12.2: Criteria for Assessing the Value of Non-Designated Townscapes

| Attribute | Criteria |
|---|---|
| Functional | A building or place should be fit for purpose, designed and delivered in a way that delivers the intended function and achieves value for money in terms of lifetime costs. |
| Mix of uses | Mix of uses to ensure easy access to facilities and encourage a healthier environment, reducing the need to travel. |
| Well-designed public space | Functional and attractive hard and soft landscape elements, well orientated and designed routes, inclusion of facilities such as seats and play equipment and public art. |
| Buildings designed to be adaptable | Flexibility to be able to respond to a range of future needs – how easily buildings change be adapted for change of use, places that are easy and practical to manage with good access, natural surveillance and hard wearing materials that are easy to repair. |
| Distinctive character | Consideration of the local pattern of street blocks and plots; building forms; details and materials; style and vernacular. |
| Attractive spaces | Consideration of streetscapes, townscapes, buildings and elements within them all, microclimates and views should all be considered. This is also affected by the way a townscape is perceived using the senses and the effect of transient elements such as the presence of human activity and resulting tranquillity or vibrancy. |
| Promotes ease of movement | All users should be able to move safely, conveniently and efficiently to and within a place, appropriate number of legible routes to and through it, good connections with each other and other destinations. |

12.45. An overall assessment of value has been made for each townscape receptors (refer to Appendix 12.1, based on an overview of the assessments made using each of the above criteria, in terms of high, medium and low value. The assessment of the value of a non-designated townscape is based on professional judgement. The assessment of a 'high' value would be given where a non-designated townscape is assessed as clearly displaying the criteria described above. A 'medium' assessment would be given where a non-designated townscape displays the criteria to a moderate extent, and an assessment of 'low' would be given where a non-designated townscape displays the above criteria to only a minor or negligible extent.

## Baseline Susceptibility of Townscape Receptors to Change

12.46. Susceptibility of townscape receptors to change has been assessed using the criteria identified in **Table 12.3**, with reference to the baseline conditions.

Table 12.3: Townscape Receptor Susceptibility to Change

| Susceptibility | Criteria |
|---|---|
| High | Little ability to accommodate the proposed development without undue harm. |
| Medium | Some ability to accommodate the proposed development without undue harm. |
| Low | Substantial ability to accommodate the proposed development without undue harm. |

## Overall Sensitivity of Townscape Receptors

12.47. The assessment of receptor sensitivity combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor, as detailed within **Appendix 12.1.**

## Criteria for Determining Sensitivity of Visual Receptors

Type of View and Number of Viewers

12.48. In terms of assessing the baseline visual sensitivity, key factors to consider are the type of view and the likely numbers of viewers (the visual receptors). The type of view and the number of viewers are described in the following terms:

- Glimpsed (i.e. in passing)/Filtered/Oblique/Framed/Open Views; and
- Few/Moderate/Many Viewers.

Value of Views

12.49. The value attached to views has regard to a number of factors, including:

- recognition through planning designations or heritage assets; and
- the popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

12.50. The assessment of the value of views is summarised in **Table 12.4** below, in terms of High, Medium and Low value. These criteria are provided for guidance only and are not intended to be absolute.

Table 12.4: Value Attached to Views

| Value | Criteria |
|---|---|
| High | Views from townscapes/viewpoints of national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations. |

| Value | Criteria |
|---|---|
| Medium | Views from townscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations. |
| Low | Views from townscapes/viewpoints with limited designations, not particularly popular as a viewpoint and with minimal or no cultural associations. |

Susceptibility of Visual Receptors to Change

12.51. The susceptibility of different types of visual receptor to changes in views is mainly a result of:

- The occupation or activity of the viewer at a given location; and,
- The extent to which a person's attention or interest may therefore be focussed on a view and the visual amenity experienced at a given view.

12.52. The assessment of a visual receptor to change is specific to the proposed development. However, the Guidelines for Landscape and Visual Impact Assessment offers the generic guidance identified in **Table 12.5** as a starting point for the assessment.

Table 12.5: Visual Receptor Susceptibility to Change

| Susceptibility | |
|---|---|
| High | Users of public space, including users of public rights of way, whose attention is likely to be focussed on the townscape and on particular views;<br><br>Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience;<br><br>Communities where views contribute to the townscape setting enjoyed by residents; and,<br><br>Travellers on scenic routes. |
| Medium | Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey; and,<br><br>Users of public space, where the view is a part of the wider experience of the place. |
| Low | People at their place of work, where the setting is not important to the quality of working life;<br><br>Travellers on road, rail or other transport routes, where the view is fleeting and incidental to the journey; and,<br><br>People engaged in outdoor sport or recreation, or users of a public space, which does not involve appreciation of views. |

12.53. The Guidelines for Landscape and Visual Impact Assessment qualifies the above examples as follows:

> "This division is not black and white and in reality, there will be a gradation in susceptibility to change. Each project needs to consider the nature of the groups of people who will be affected and the extent to which their attention is likely to be focussed on views and visual amenity." (page 114, paragraph 6.35).

Overall Sensitivity of Visual Receptors

12.54. The assessment of receptor sensitivity combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor, as detailed in **Appendix 12.2.**

## Predicted Townscape and Visual Impact Criteria

12.55. The predicted townscape and visual impacts of the proposed development are set out in **Appendix 12.1** and **Appendix 12.2** respectively.

Size and Scale of Effects

12.56. The size and/or scale of effects relates to the scale of physical changes in the townscape and the scale of the visible change in views, such as the loss or addition of features. This is broadly rated along the following scale:

- No Change – change will not be perceptible.
- Negligible – change will be just discernible.
- Minor – a small change will be perceptible.
- Moderate – change will be clearly noticeable.
- Major – total change will occur.

Geographical Extent of Effects

12.57. The geographical extent of effects relates to:

- the area over which townscape effects are likely to be experienced, i.e. this could be at the site level, the immediate locality, across a neighbourhood or across a series of neighbourhoods (city-wide);
- the area over which the changes are likely to be visible, i.e. viewpoint within the site, viewpoint within the immediate locality, viewpoint across/ through a neighbourhood or a vista or vantage point across neighbourhoods or the city skyline (city-wide).

Duration/ Reversibility

12.58. Effects may be experienced over a range of timescales. For this assessment, the following timescales are considered appropriate:

- Short-term: 1 year or below.
- Medium-term: Between 1 and 10 years in duration.
- Long-term: Greater than 10 years in duration.

12.59. Effects may be temporary, permanent or reversible over time. For example, visual effects arising from construction activities may be limited solely to the construction period and therefore only temporary. The assessment therefore considers the practicality of effects being reversed.

## Magnitude of Townscape Effects

12.60. The magnitude of a townscape effect is assessed in terms of its size or scale, the geographical extent of the area influenced by that effect, its duration and degree of reversibility and the impact these are likely to have on the baseline character of the townscape element.

12.61. The magnitude of change in the townscape takes into consideration the following factors:

- the extent/proportion of townscape elements lost or added;
- the contribution of that element to townscape character and the degree to which aesthetic/perceptual aspects are altered; and,
- whether the effect is likely to change the key characteristics of the townscape, which are critical to its distinctive character.

Table 12.6: Magnitude of Townscape Effects

| Category | Criteria |
|---|---|
| Major adverse townscape effect | The proposals will result in a total change in the key characteristics of townscape character; will introduce elements totally uncharacteristic to the attributes of the receiving townscape; and/or will result in a substantial or total loss, alteration or addition of key elements/features/characteristics. |
| Moderate adverse townscape effect | The proposals will result in a partial change in the key characteristics of townscape character; will introduce elements partially uncharacteristic to the attributes of the receiving townscape; and/or will result in partial loss, alteration or addition of key elements/features/characteristics. |
| Minor adverse townscape effect | The proposals will result in a small change in the key characteristics of townscape character; will introduce elements that are not uncharacteristic to the attributes of the receiving townscape; and/or will result in a minor loss, alteration or addition of elements/features/characteristics. |
| Negligible adverse townscape effect | The proposals will result in a just discernible change to townscape character/elements/features/characteristics. |
| Negligible townscape benefit | The proposals will result in a just discernible improvement to the townscape character/elements/features/characteristics. |
| Minor townscape benefit | The proposals will achieve a degree of fit with the townscape character/elements/features/characteristics and go some way towards improving the condition or character of the townscape. |
| Moderate townscape benefit | The proposals will achieve a good fit with the townscape character/elements/features/characteristics, or would noticeably improve the condition or character of the townscape. |
| Major townscape benefit | The proposals will totally accord with the townscape character/elements/features/characteristics, or would restore, recreate or permanently benefit the condition or character of the townscape. |
| No Change | The proposals will not cause any change to the townscape character/ elements/ features/ characteristics. |

## Magnitude of Visual Effects

12.62. The magnitude of a visual effect is assessed in terms of its size or scale, the geographical extent of the area influenced by that effect, its duration and degree of reversibility and the impact these are likely to have on the baseline character of the view.

12.63. The magnitude of change in the view relates to the degree of contrast or integration likely to result from the proposed development and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

12.64. The criteria identified in **Table 12.7** are used to assess the magnitude of visual effects, based on the degree of change to the view or composition.

Table 12.7: Visual Effects - Magnitude

| Category | Criteria |
|---|---|
| Major adverse or beneficial visual effect | The proposals will cause a dominant or complete change or contrast to the view, resulting from the loss or addition of substantial features in the view and will substantially alter the appreciation of the view. |
| Moderate adverse or beneficial visual effect | The proposals will cause a clearly noticeable change or contrast to the view, which would have some effect on the composition, resulting from the loss or addition of features in the view and will noticeably alter the appreciation of the view. |
| Minor adverse or beneficial visual effect | The proposals will cause a perceptible change or contrast to the view, but which would not materially affect the composition or the appreciation of the view. |
| Negligible adverse or beneficial visual effect | The proposals will cause a barely perceptible change or contrast to the view, which would not affect the composition or the appreciation of the view. |
| No change | The proposals will cause no change to the view. |

## Nature of Effects

12.65. The nature of effects may be positive or negative (beneficial or adverse), or neutral. Neutral effects recognise that there will be a change to the receptors, however this change is in keeping with the existing characteristics of the receptor.

12.66. Effects may also be direct or indirect. Direct effects are those that result directly from a development itself, whereas indirect effects may arise as a consequential change resulting from development.

## Significance of Effects

12.67. The scale shown in **Table 12.8** is used to guide the assessment of the significance of both townscape and visual effects, from a combination of the assessment of receptor sensitivity and the magnitude of effects:

Table 12.8: Assessment of Townscape or Visual Significance

| | Magnitude of Effect | | | |
|---|---|---|---|---|
| Sensitivity of Receptor | Major Effect | Moderate Effect | Minor Effect | Negligible Effect |
| High | Major Adverse/Beneficial | Major Adverse/Beneficial | Minor Adverse/Beneficial | Negligible |
| Medium | Major - Moderate Adverse/Beneficial | Moderate Adverse/Beneficial | Minor Adverse/Beneficial | Negligible |
| Low | Moderate - Minor Adverse/Beneficial | Minor Adverse/Beneficial | Negligible | Negligible |

12.68. The nature of effects may be positive or negative (beneficial or adverse) or neutral. Neutral effects recognise that there will be a change to the receptors, however this change is in keeping with the existing characteristics of the receptor. The table has regard to guidance in the Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013, at paragraph 5.56, page 92 (significance of landscape effects) and paragraph 6.44, page 116 (significance of visual effects).

12.69. For the purpose of the Townscape and Visual Impact Assessment, **moderately significant** effects and **significant effects** are considered to be significant in the meaning of EIA Regulations (2011). This acknowledges the extent level of development that is already present on the Site and its immediate surroundings, the condition of the wider townscape and adopted policy aspirations for growth and enhancement of the Etihad Stadium as a major sporting venue.

## Baseline Conditions

### Site Location

12.70. The Site is located to the northeast of Manchester City Centre, approximately 2.1km north east of Manchester Piccadilly Railway Station. It is located within the Etihad Campus, which includes the Etihad Stadium, the Academy Stadium, City Football Academy (CFA) training facility and the Club's headquarters. The Campus and landmark Stadium building define the local townscape character and urban grain, with large modern structures set within extensive areas of open concourse and landscape. Whilst the Campus is focused on sport, recreation and commercial activities, immediately around it are a number of large residential estates.

12.71. The Site itself is currently used as a main northern concourse entrance to the Stadium and includes the existing northern stand. It is located immediately west of the A6010 Alan Turing Way, and approximately 100m northeast of the Etihad Campus Metrolink stop.

12.72. The site is located to the immediate south of the Ashton Canal, which forms the route of a number of key recreational walking and cycling routes, including:

- The Medlock Valley Way;
- The Cheshire Ring Canal Walk;

- Regional Cycle Network Route 86, and;
- National Cycle Network Route 60, which also run north along the site's eastern edge.

12.73. The Grade II registered Phillips Park, a Grade II listed registered landscape that opened in 1846 and forms one of the world's oldest municipal parks.

12.74. At the wider level, the site is located within the Eastlands Regeneration Framework (ERF) area. An update to the ERF was endorsed by Manchester City Council's Executive Committee in July 2017. The ERF supports the on-going regeneration of the Eastlands area. The broad vision for Eastlands is for it to become a place which is attractive for people to live, work and to visit; an area which builds upon its assets to provide a distinctive contribution to the overall success of the city region; and to be a place where all residents are able to share in the long-term success of the area. Central to the long-term vision for the Etihad Campus and the wider area has been the ambition to establish it as a place with a globally competitive sport, leisure and recreation offer.

Historical Development

12.75. The historical development of the Site through the twentieth century is recorded in Figure 12.2 in Appendix 12.3. At the turn of the 20th century the Site was comprised of loose network of buildings and streets, with the Ashton Canal running along the north western edge of the Site. A series of terraced properties are identifiable along the former Mill Street (now Alan Turing Way) along the eastern boundary.

12.76. By 1922 the Site, as well as its immediate surroundings, have been urbanised. Across the northern areas of the Site, a network of terraced residential streets are visible, with railway sidings and infrastructure over the spaces that are now the northern stand to the Stadium. The Site retained a similar form until the late twentieth century, where industrial decline and associated clearances resulted in a fragmented urban grain on the Site and its surroundings.

Heritage Designations

12.77. There are no heritage designations within the Site. Heritage designations within the wider study area are shown in **Figure 12.3** in **Appendix 12.3.**

12.78. The following listed buildings sit within the immediate vicinity of the Site.

- Ashton Canal Lock Keepers Cottage (Grade II)
- Ashton Canal Lock Number 6 (Grade II)
- Entrance Lodge to Main Entrance of Phillips Park Cemetery (Grade II)
- Gates and Railings to Main Entrance of Phillips Park Cemetery (Grade II)
- Cemetery Office at Philips Park Cemetery (Grade II)
- Cemetery Chapel at Philips Park Cemetery (Grade II)

12.79. Within the wider study area, a number of locks and bridges, as well as mills on Ashton Canal, including the Grade II* listed Hope Mill and Victoria Mill in Miles Platting.

12.80. Immediately east of the Site are two Grade II listed Parks and Gardens - Philips Park and Philips Park Cemetery.

Townscape Character

12.81. Townscape character areas are presented in **Figure 12.4** in **Appendix 12.3**

12.82. The Site is the north stand of the Etihad Stadium and surrounding concourse area. This currently serves as a gathering area to the stadium from the north side via Joe Mercer Way, with the main fan shop unit and a series of tensile canopies.

12.83. The wider area is characterised by a mix of low rise, low density terraced houses arranged over a typical suburban layout, areas of light industrial uses or cleared and undeveloped land, Etihad Campus' large scale sports amenities, pockets of high density residential and larger established greenspaces, including Phillips Park and Cemetery, the Mersey Valley and Victoria Park.

12.84. Overall, the area is characterised by Etihad Campus, in particular the monumental Etihad Stadium and the smaller indoor arenas, their associated outdoor sport pitches and surrounding landscape. On approach to the area this character is communicated through quality landscape along major routes including the elevated walkway across the Alan Turing Way/Ashton New Road junction.

Urban Grain

12.85. Urban grain on the Site and in the surrounding area is shown in Figure 12.5 of Appendix 12.3.

12.86. The Site sits within a wider fragmented area, with a mix of large footprint sports stadia, big box retail and light industrial units and low-density housing with pockets of high density multi-storey apartment blocks.

12.87. The Site itself contains the northern extent of the main Etihad Stadium as well as a centrally positioned small low rise building of Sports Memorabilia shop and a series of tensile canopies symmetrically positioned on the sides.

12.88. The area is primarily characterised by the extensive footprint of Etihad Stadium just south of the Site and neighbouring sporting facilities within Etihad Campus and the National Cycling Centre. The stadia and sports facilities consist both of large scale built forms and open expanses of outdoor sports courts and associated approaches and landscaped areas. The outdoor sports pitches in themselves contribute to the vast urban grain of the area. Big box commercial sheds are found in larger groups to the very north of the surrounding area and along and in the vicinity of the Ashton Canal. Larger areas of low density terraced houses add a coarser grain to the surrounding area, with pockets of even denser historic Victorian terraces.

Land Use

12.89. Land use on the Site and in the surrounding area is shown in Figure 12.6 in Appendix 12.3.

12.90. The land use in the immediate vicinity of the Site is dominated by regionally important sports and leisure facilities, the Etihad Stadium, Manchester Tennis and Football Centre and Manchester Regional Arena. To the northeast of the Site is the new leisure uses of the Coop Live Arena (under construction), and further away – approximately 200 meters – the National Cycle Centre. Adjacent to this is a residential area comprised of higher density apartment blocks and lower density terrace housing.

12.91. Phillips Park and Cemetery are major recreational routes. Ashton Canal is an important regional recreational and commuting route.

12.92. Surrounding the immediate area in all directions is a mix of clusters of sports facilities, low density residential housing and industrial sheds. Schools and churches are more or less regularly distributed within the residential neighbourhoods, that also at times include a shop or newsagent. ASDA Eastlands Supercentre stands out as a major shopping destination.

Building Heights

12.93. Building heights on the Site and in the surrounding area are shown in Figure 12.7 in Appendix 12..3

12.94. The site is part of the main stadium structure and surrounds – which dominates the wider area in terms of its height and massing, resulting in a landmark to the local area.

12.95. The wider surrounding area is broadly characterized by buildings of 2 to 3 storeys, which reflects the predominantly residential and light industrial use – although large in building footprint, the commercial sheds are rarely taller than 3 storeys. The Site and Stadium create a taller height datum, with modern apartment blocks and towers to the north east on the opposite side of Alan Turing Way, local gasholders reaching heights of up to 10 and 14 storeys (and over 100m). The stadium (at over 105m) is an iconic and prominent landmark within the wider area, whilst the gasholders also act as more local landmarks and navigational tools. Sports facilities within the wider area deviate only slightly from that datum.

12.96. On the edges of the wider study area the historic mills set a height datum of 6-8 storeys, accompanied by residential blocks and towers of a similar, if not slightly higher number of storeys.

Movement & Linkages

12.97. Key movement routes surrounding the Site are shown in **Figure 12.8** in **Appendix 12.3.**

12.98. The Site is bound by Ashton Canal walk and Metrolink line and tram stop to the north. Pedestrian access onto the Site is from the north via a series of staircases directly from the tram stop and via CityLink path. An existing bridge connects the Site across Ashton Canal to the Co-op Live Arena (under construction) and other sports facilities. There is a service road running all the way around the Stadium and through the Site.

12.99. The Cheshire Ring Canal Walk, Medlock Valley Way and Citylink are all long-distance recreational walking and cycling routes used by multiple users for multiple purposes, including commuting into the City. Sustrans cycle network also runs along this part of Ashton Canal, close to the northern boundary of the Site.

12.100. Ashton New Road is a major route into and out of Manchester City Centre and designated cycle lanes make it a popular commuting route for cyclists.

12.101. A landmark elevated walkway connects Etihad Stadium with the City Football Academy.

12.102. Around the Stadium and through the Site itself the main concourse areas provide pedestrian links to the canal, Metrolink and adjacent roadways.

Site Character

12.103. Site Character is shown in **Figure 12.9** in **Appendix 12.3.**

12.104. The site is currently being used as the north stand of the stadium and main northern gathering area for the visitors during football matches. It is positioned directly at the top of staircases leading up from the nearby tram stop and is connected to the neighbouring sports facilities and the Co-op Live Arena (under construction) by an elevated walkway.

12.105. The Site contains both the existing stadium north stand as well as the entrance concourse and low rise building of fan shop and a series of tensile canopies symmetrically positioned on the sides along blue-coloured circular paving.

## Identification and Evaluation of Significant Effects

### Potential Construction Phase Effects

12.106. The Outline Construction Management Plan provides an initial summary of Construction Phase Effects. This represents a realistic 'worst case' assessment as the aforementioned detail often forms a means of

mitigating against potential effects. The likely significant effects are assessed in more detail in Appendices 12.1 and 12.2.

12.107. Sources of townscape and visual construction effects include:

- Site setup and site compound (visual effects).
- Site/boundary fencing (visual effects).
- Highways alterations, site access and deliveries (movement and linkages - townscape.
- Site clearance, removal and disposal of existing vegetation and scrub as defined within the proposals (landscape and visual effects).
- Contractor parking, plant and equipment (visual effects).
- Works associated with service diversions and removal/ capping of redundant services (visual effects).
- Ground Works including site levelling & preparation (topography – townscape effects, and visual effects).
- Earthworks (incl. formation of retaining walls and piled foundations etc.) (topography – townscape effects, and visual effects).
- Works associated with construction of the new events area (visual effects).
- Public Realm and associated landscaping works (townscape and visual effects).

## Potential Townscape Effects

12.108. The components of the townscape which may potentially be affected by the Proposed Development are known as the townscape receptors. These include the characteristics and character of the townscape, and the character and quality (or special qualities) of designated areas.

12.109. Likely townscape effects have been identified with reference to interactions between the Proposed Development and townscape receptors. The likely significant effects (highlighted below) are assessed in more detail in Appendix 12.1.

Table 12.9: Potential Townscape Effects

| Townscape Element | Construction | Operation |
|---|---|---|
| Heritage Designations | Indirect effect/local extent of effect. Any visual relationships with between heritage assets and the site will be assessed within the visual assessment. | Indirect. Any visual relationships between heritage assets and the site will be assessed within the visual assessment. |
| Townscape Character | Direct effect/city-wide extent of effect. | Direct effect/city-wide extent of effect. |
| Urban Grain | Direct effect/local extent of effect. | Direct effect/local extent of effect. |
| Land Use | Direct effect/local extent of effect. | Direct effect/local extent of effect. |
| Building Heights | Direct effect/city-wide extent of effect. | Direct effect/city-wide extent of effect. |
| Movement and Linkages | Direct effect/site extent of effect. | Direct effect/local extent of effect. |
| Site Character | Direct effect/site extent of effect. | Direct effect/site extent of effect. |

## Potential Visual Effects

12.110. Likely visual effects have been identified with reference to interactions between the Proposed Development and visual receptors. The potential significant effects (highlighted below) are assessed in more detail in **Appendix 12.2**.

### Table 12.10: Potential Visual Receptors

| Viewpoint Location and No. | Construction | Operation |
|---|---|---|
| Viewpoint 1: View north west from pedestrian footbridge leading to Commonwealth Way, Etihad Stadium. | Views of construction activities adjacent to Stadium. | Clear change in the view. Open view of the Proposed Development in conjunction with the Stadium. |
| Viewpoint 2: View south west from footpath entrance to canal and Alan Turing Way – adjacent to Listed Lock Keepers Cottage. | Views of construction works beyond the treeline. | Clear change in the view. Stadium will appear above existing treeline. |
| Viewpoint 3: View from Joe Mercer Way looking south to stadium North Stand. | Open views of construction works to the Stadium. | The Proposed Development will be a new dominant building across the view, on what is a key approach route. |
| Viewpoint 4: View looking south east towards stadium on CityLink pedestrian and cycle link from Piccadilly Station. | Partial views of construction works. Above existing buildings. | Clear change in the view with new taller built form. Screening provided by existing built form and tree cover. |
| Viewpoint 5: View from footway of A662 Ashton New Road looking north east to Site. | Partial views of construction works beyond stadium. | Partial change to view - additional Stadium element visible in background. |
| Viewpoint 6: View from footway of Grey Mare Lane and residential area to the south. | Views of construction works will be partially visible in distance. | Minor glimpsed view of new buildings beyond the main Stadium. |
| Viewpoint 7: View from Velopark foot/ cycle bridge looking east towards site. | Partial views of construction works beyond stadium. | Partial change to view - additional Stadium element visible in background. |
| Viewpoint 8: View from pathway with Philips Park looking east towards site. | Partial views of construction works beyond existing buildings and trees. | Partial change to view - additional Stadium element visible in background. |
| Viewpoint 9: View south towards site from pedestrian crossing on Alan Turing Way A6010, at junction with Brisco Lane. | Minor, glimpsed views of construction works. | Minor, glimpsed views of new Stadium buildings. |
| Viewpoint 10: View from pathway in Saxon Saint Park looking south east towards site. | Partial views of construction works on skyline. | Change in the character of the view. New Stadium structure will be clearly visible on the skyline. |

| | | |
|---|---|---|
| Viewpoint 11: View from Canal Footpath adjacent to Lock 6 | Partial views of construction works beyond existing trees. | Partial change to view - additional Stadium element visible in background. |

## 2014 Extant Consent

12.111. The Etihad Stadium is subject to an extant planning permission for an extension to the North Stand of the Stadium, which is located in the same location of the Site. The scheme includes alterations to the Etihad Stadium, including increasing the overall height of the South and North stands and associated elevational alterations, to allow an increase each stand capacity by up to 6,250 seats respectively and up to 2,000 additional pitch side seats creating a total match day capacity of up to 62,170 seats (from 47,670), expansions of concourse facilities, alteration to public realm including changes to car parking layout, landscaping and boundary treatments and associated infrastructure works.

12.112. The permission establishes an acceptable scale and nature of change for the Site – and specifically the North Stand element. The Proposed Development seeks a similar scale of change to the stand element, but also introduces additional built form and associated new mix of uses, including a hotel.

Construction Phase Effects Comparison

12.113. The additional elements within the Proposed Development could create additional construction phase effects to Townscape and Visual receptors than that originally assessed in the 2014 permission. This is due to the increase in built form and extent of construction works on site. The scale of this change is likely to be limited as significant construction works were already envisaged.

Operation Phase Effects Comparison

12.114. The additional hotel, leisure and office buildings that project beyond the northern extent of the stadium will introduce new built form beyond that assessed in 2014. Townscape receptors were previously assessed as negligible to minor beneficial, and it is likely that the Proposed Development would have additional localised effects, but that these effects in relation to the wider study area would be unchanged. Visual receptors will experience additional effects, particularly in relation to views immediately around the stadium, where the new built form will be particularly prominent. In wider views the additional taller built elements will also be more prominent that increase the visual effects.

## Mitigation Measures

12.115. 'Embedded mitigation' is a form of mitigation that has been incorporated into the design of the development through an iterative design process, effectively 'designing out' potential townscape and visual effects.

Construction Phase – Embedded Mitigation

12.116. The following mitigation measures with relevance to townscape and views that are included in the 'Outline Construction Management Plan' and CEMP are described in brief below:

Table 12.11: Summary of Embedded Construction Mitigation Measures

| Mitigation Measures | Effects |
|---|---|
| Where practical, off-site construction and 'just in time' deliveries will be promoted. Deliveries and waste removal will be managed by the Contractor. No off-site stacking of deliveries will be permitted. | Minimise disruption to local road network and reduce transportation distances. |

| | |
|---|---|
| Contractors will provide and maintain a Construction Travel Plan for all Contractor and Subcontractor employees for the duration of the works | Promoting public transport to reduce the vehicular movement associated with the works. |
| Construction techniques and the associated plant and equipment selected to minimise noise and vibration intrusions on surrounding areas. | Minimise noise and vibration intrusions on surrounding areas. |
| Site operating hours will adhere with Manchester City Council's (MCC) 'Environmental Protection Information for Developers': | Minimise disruption to surrounding areas. |
| The Site is secured to the north, east, south and west by 2.4m high Vehicular Control Barrier (VCB) Hoarding. This hoarding will be used to the perimeter of the Site and sealed to the ground | Maintain crowd flow areas, segregation of the works and the protection of the public. Further reduce dust arising and further prevent materials and debris leaving the Site and potentially entering water bodies. Utilised to inform others of the Proposed Development and coloured as appropriate. |
| Directional lighting will be used to illuminate the Site. | Minimise light spill from the Site and reduce the impact of the localised townscape and ecology |

## Operational Phase – Embedded Mitigation

12.117. Forms of mitigation embedded within the operational phase are described in detail in the Design and Access Statement that accompanies this application. The Proposed Development has been developed in accordance with good design principles which avoids, reduces or offsets potential effects on the townscape and views. The key principles relevant to the purposes of this report are summarised below.

Built form and Massing.

- This new facility is intended to become a landmark for the campus, with an identity that acknowledges Manchester's rich heritage of manufacture trade and export, while bringing new opportunity and energy into the life of the campus and the football club.
- The venue respects the site context by ensuring it does not exceed the height of the existing adjacent buildings, becoming part of the developing family of facilities. Also, the proposed development acknowledges the view corridors to all sides, the apparent symmetry of the design presenting a recognisable identity to all approaches.
- The simple and distinctive design of the proposal enhances the environment and character of the northern Campus, whilst ensuring that the unique form of the Etihad Stadium remains the 'jewel in the crown' to the south.
- The newly expanded stand will have a unique scale and character. The proposal seeks to improve on this character by unifying and connecting the club tier to the new 'Upper tier' by stitching it in seamlessly, linking the fan groups together, whilst being covered by a unique roof with individual geometry.
- The two blocks (office and hotel) are kinked inwards to create a sense of enclosure to the City Square and introduce a more engaging approach from Joe Mercer Way.
- To increase the use of the City Square and its retail and hospitality functions, a canopy is added to cover the entirety of it. The canopy sits on top of the retail and hospitality blocks.

Materiality

- The ship is a symbol of Manchester and also expressed onto the Manchester City FC badge. The desire is that the Etihad North Stand expansion alongside the commercial and hotel buildings will celebrate this heritage and express it onto the facades.
- The North Stand expansion is wrapped in the materiality of the existing stadium ensuring a visual conformity. The commercial and hotels blocks use similar materials, but they are expressed differently given their functional requirements.
- The existing Etihad expresses verticality on its main mass, and the spiral cores show strong hints of horizontality. The vision for the North stand expansion is to celebrate verticality, while the commercial and hotel facades combine both these expressions, horizontality and verticality. This is because the North Stand extension looks like part of the main stadium mass, whereas the hotel and commercial buildings are separated from it. Doing this ensures a gradual blend with the existing stadium fabric and expression.
- The external appearance will be contemporary with the finish being predominantly glazed curtain walling, pressed metal cladding and stacked masonry blocks cladding on a metal framing system. The cladding finish is sympathetic to that of the exterior football stadium finish.
- The external rippling vertical fins to the facade and the grid form of the curtain walling is reminiscent of water and the Victorian warehouses that typified the region in the past. Etihad North Stand expansion alongside the commercial and hotel buildings will celebrate this heritage and express it onto the facades.
- The commercial & hotel blocks are situated upon a reclaimed masonry plinth which is a direct refence to the Mancunian industrial heritage of the area.

Use

- Expansion to the Etihad Stadium North Stand, which will increase capacity of the Etihad Stadium to over 60,000. The proposed development will make a positive contribution to the neighbourhood and ongoing Campus development to support Manchester as a thriving and sustainable city for residents and business.
- From a once previously deprived area, the football stadium and associated buildings, new road infrastructure and tramlink has transformed the area to a ‘must go to place’. It is hope that the hotel will become a ‘must stay place’ and not just for football matches but also for music and social events.
- The design identifies opportunities to develop additional uses of the facilities that support the developing sports and entertainment campus, to create more activity and improve visitor experience. The City Hall, shop, museum, football experience, roof walk, hotel, concourses and lounges extend the potential utilisation of the building as a destination to boost tourism, culture, and leisure spaces to the local community.
- Adjacent to the North Stand the proposed development is activating the ground floor by including the team shop and museum and various hospitality offerings.
- A key new visitor attraction to the stadium will be the proposed rooftop walk. The rooftop walk will allow visitors unique access to. the highest extremities of the stadium structure, providing memorable moments and views of the stadium rooftop pitch and seating bowl.

Landscape

- The site is known for its industrial and trading heritage, made possible through the usage of ships through the Ashton Canal. These characteristics of Manchester are portrayed in the City Square design, having the green spaces infiltrating and breaking down the rigid pattern that mimics the ship decking City Square becomes a green space between buildings, in a main hub of the city of Manchester.

- City Square will be a space of primarily hospitality offering on match-day and will be accessible by the general public.
- The unique covered square creates a pre match fan zone for 3000 fans. Surrounding the square will be a range of food and beverage outlets, together with the new club shop, museum, football experience 4000m2 of workspace and a 401-room hotel. Many of the front of house spaces are proposed to be available on non-match days extending the reach of the facilities beyond the football fan.
- The hotel and the adjacent buildings are located on the fringe of the centre of Manchester in a semi urban setting that is reflected by its existing hard and soft landscape features which are made up of robust materials that contrast against the metallic elements of the football stadium which dominates the skyline.

### Supplementary Mitigation and Enhancement

12.118. Given the nature of the iterative design process leading to the extent of embedded mitigation into the design, the requirement for supplementary mitigation is limited. The mitigation measures described below are focussed on ensuring that the management and maintenance of the Proposed Development limits any further adverse townscape and visual effects.

12.119. The implementation of good site management, maintenance and housekeeping would ensure that the temporary deterioration to townscape character and visual amenity during the construction phase would be kept to a practical minimum. Despite these better practice measures, there would still remain inevitable adverse effects during construction works.

12.120. An operational management strategy will be submitted with the application to provide further mitigation and maintenance once the site is operational.

## Cumulative Effects

12.121. The assessment of the Proposed Development has been supplemented by a cumulative assessment of committed developments in order to understand if any further potential significant environmental effects are likely to arise. Cumulative effects are defined as impacts that result from additional changes to the townscape or visual amenity caused by the Proposed Development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

12.122. A total of 9 additional committed developments have been considered following consultation with the Council. The locations are highlighted and listed in **Figure 12.10 in Appendix 12.3**.

12.123. When the existing Townscape Baseline is considered against the 9 committed developments, no townscape receptors have been assessed as having potentially significant effects within the wider Study area. This is primarily due to the small number of schemes present in the study area, and the scale of development. Individual developments are generally likely to have isolated localised effects which have little impact in relation to the wider area, and as such cumulative effects are negligible. There is a grouping of developments to the west of the Site around the Holt Town area, which have the potential for some minor cumulative effects, but the general scale of development is limited, which would reduce its potential magnitude.

12.124. No Visual receptors were assessed as experiencing additional cumulative effects from the committed developments other than from the adjacent Co-op Arena development – that is already partially completed. This was due to the distance of the developments to the viewpoints/ Site where schemes were either so distant to be undiscernible, or screened by intervening landform, buildings and vegetation. The main building massing of the Co-op development is already visible at near full height within the views photography, and so any additional effects are predicted to be negligible.

## In-Combination Climate Change Impact (ICCI) Assessment

12.125. The UKCP18 climate projection data for the north-west England under RCP8.5 have been reviewed in the context of this TVIA assessment. The only means through which climate change projections are considered to potentially effect the outcomes of this TVIA is through potential adverse impacts on existing and proposed site vegetation e.g. due to additional stresses from hotter and drier summers and wetter winters. However, given the relatively modest proposed planting (mainly new trees to the City Square and Hotel approaches), providing little visual screening role within the scheme, and the potential for these to include climate resilient species, it is not anticipated that climate change trends will affect the outcomes of the assessment and an ICCI assessment has therefore not been undertaken.

## Residual Effects

12.126. The results of the townscape and visual assessment are set out in full within **Appendices 12.1 and 12.2**.

12.127. A summary of all residual effects are set out in Table 12.12 below, with effects assessed as significant highlighted in bold. For the purposed of this Townscape and Visual Impact Assessment, 'moderately significant' effects and 'significant' effects are considered to be significant in EIA terms (EIA Regulations 2017).

Table 12.12 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **Heritage Designations** | Indirect effect/local extent of effect. (Any visual relationships with between heritage assets and the site will be assessed within the visual assessment) | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to be **not significant.** |
| **Townscape Character** | Direct effect/city-wide extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **minor significance.** |
| **Urban Grain** | Direct effect/local extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **minor significance.** |
| **Land Use** | Direct effect/local extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **minor significance.** |
| **Building Heights** | Direct effect/city-wide extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **minor significance.** |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Movement & Linkages | Direct effect/site extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |
| Site Character | Direct effect/site extent of effect. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have moderate significance. |
| Viewpoint 1: View north west from pedestrian footbridge leading to Commonwealth Way, Etihad Stadium. | Views of construction activities adjacent to Stadium. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 2: View south west from footpath entrance to canal and Alan Turing Way – adjacent to Listed Lock Keepers Cottage. | Views of construction works beyond the treeline. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 3: View from Joe Mercer Way looking south to stadium North Stand. | Open views of construction works to the Stadium. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have moderate significance. |
| Viewpoint 4: View looking south east towards stadium on CityLink pedestrian and cycle link from Piccadilly Station. | Partial views of construction works. Above existing buildings. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 5: View from footway of A662 Ashton New Road looking north east to Site. | Partial views of construction works beyond stadium. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 6: View from footway of Grey Mare Lane and residential area to the south. | Views of construction works will be partially visible in distance. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |
| Viewpoint 7: View from Velopark foot/ cycle bridge looking east towards site. | Partial views of construction works beyond stadium. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Viewpoint 8: View from pathway with Philips Park looking east towards site.** | Partial views of construction works beyond existing buildings and trees. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **moderate significance.** |
| **Viewpoint 9: View south towards site from pedestrian crossing on Alan Turing Way A6010, at junction with Brisco Lane.** | Minor, glimpsed views of construction works. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to be **not significant.** |
| **Viewpoint 10: View from pathway in Saxon Saint Park looking south east towards site.** | Partial views of construction works on skyline. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to have **minor significance.** |
| **Viewpoint 11: View from Canal Footpath adjacent to Lock 6** | Partial views of construction works on skyline. | CMP proposals | Indirect, temporary, short-term adverse effect which is considered to be **not significant.** |
| Operational | | | |
| **Heritage Designations** | Indirect. (Any visual relationships between heritage assets and the site will be assessed within the visual assessment) | Architectural design – material reference to industrial past and ship forms within buildings and landscape. | Long-term **beneficial** effect which is considered to be **not significant.** |
| **Townscape Character** | Direct effect/city-wide extent of effect. | Architectural design – support of campus character and landmark stadium. Enhancement of stadium approaches and matchday experience. | Long-term, **beneficial** effect which is considered to be **moderately significant.** |
| **Urban Grain** | Direct effect/local extent of effect. | Architectural design – responding to existing stadium / sports campus form – enhancement to main approaches/ concourses. | Long-term, **beneficial** effect which is considered to be **moderately significant.** |
| **Land Use** | Direct effect/local extent of effect. | Additional proposed land uses and enhanced visitor facilities – supporting the sites role as a major sporting destination. | Long-term, **beneficial** effect which is considered to be **moderately significant.** |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Building Heights** | Direct effect/city-wide extent of effect. | Architectural design – massing responding to existing stadium – supporting its role as a landmark building to the wider area. | Long-term, **beneficial** effect which is considered to be **moderately significant.** |
| **Movement & Linkages** | Direct effect/local extent of effect. | Enhanced movement routes to the stadium and supporting facilities – new high-quality pedestrian concourse. | Long-term, **beneficial** effect which is considered to be of **minor significance.** |
| **Site Character** | Direct effect/site extent of effect. | Distinctive new contemporary built form and enhancement of surrounding pedestrian concourse and stadium surrounds. | Long-term, **beneficial** effect which is considered to be **moderately significant.** |
| **Viewpoint 1: View north west from pedestrian footbridge leading to Commonwealth Way, Etihad Stadium.** | Clear change in the view. Open view of the Proposed Development in conjunction with the Stadium. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |
| **Viewpoint 2: View south west from footpath entrance to canal and Alan Turing Way – adjacent to Listed Lock Keepers Cottage.** | Clear change in the view. Stadium will appear above existing treeline. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to have **minor significance.** |
| **Viewpoint 3: View from Joe Mercer Way looking south to stadium North Stand.** | The Proposed Development will be a new dominant building across the view, on what is a key approach route. | Architectural design, materiality, land uses and landscape proposals. | Long-term, **beneficial** effect which is considered to have **major significance.** |
| **Viewpoint 4: View looking south east towards stadium on CityLink pedestrian and cycle link from Piccadilly Station.** | Clear change in the view with new taller built form. Screening provided by existing built form and tree cover. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |
| **Viewpoint 5: View from footway of A662 Ashton New Road looking north east to Site.** | Partial change to view - additional Stadium element visible in background. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Viewpoint 6: View from footway of Grey Mare Lane and residential area to the south.** | Minor glimpsed view of new buildings beyond the main Stadium. | Architectural design & materiality | Long-term, irreversible, not applicable effect which is considered to be **not significant.** |
| **Viewpoint 7: View from Velopark foot/ cycle bridge looking east towards site.** | Partial change to view - additional Stadium element visible in background. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |
| **Viewpoint 8: View from pathway with Philips Park looking east towards site.** | Partial change to view - additional Stadium element visible in background. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to have **minor significance.** |
| **Viewpoint 9: View south towards site from pedestrian crossing on Alan Turing Way A6010, at junction with Brisco Lane.** | Minor, glimpsed views of new Stadium buildings. | Architectural design & materiality | Long-term, irreversible, not **beneficial** effect which is considered to be **not significant.** |
| **Viewpoint 10: View from pathway in Saxon Saint Park looking south east towards site.** | Change in the character of the view. New Stadium structure will be clearly visible on the skyline. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |
| **Viewpoint 11: View from Canal Footpath adjacent to Lock 6** | Change in the character of the view. New Stadium structure will be clearly visible on the skyline. | Architectural design & materiality | Long-term, **beneficial** effect which is considered to be of **minor significance.** |

## Summary

12.128. A total of 8 townscape receptors and 11 visual receptors were identified and considered as part of this assessment.

12.129. The assessment considered 4 scenarios:

- Scenario 1 – baseline as existing today with committed developments;
- Scenario 2 – baseline as 2014 extant consent (qualitative assessment);
- Scenario 3 – baseline plus Proposed North Stand development; and,
- Scenario 4 – baseline plus Proposed North Stand development and mitigation.

12.130. All mitigation is embedded, therefore the assessment for scenarios 3 and 4 will be the same.

Scenario 1

12.131. When the existing Townscape Baseline is considered against the 9 committed developments, no townscape or Visual receptors have been assessed as having potentially significant effects at the construction and operational phases of development. Please refer to para12.122 for further commentary on cumulative effects.

Scenario 2

12.132. The Etihad Stadium is subject to an extant planning permission for an extension to the North Stand of the Stadium, which is located in the same location of the Site. The permission establishes an acceptable scale and nature of change for the Site – and specifically the North Stand element. The Proposed Development seeks a similar scale of change to the stand element, but also introduces additional built form and associated new mix of uses, including a hotel.

12.133. The predicted effects from the Proposed Development were compared qualitively with this permission.

12.134. It is predicted that the additional elements could create additional construction phase impacts to Townscape and Visual receptors due to the increase in built form and extent of construction works on site. The scale of this change is however limited as significant construction works were already envisaged.

12.135. The additional hotel, leisure and office buildings that project beyond the northern extent of the stadium will introduce new built form beyond that assessed in 2014. Townscape receptors would have additional localised effects, but that these effects in relation to the wider study area would be unchanged. Visual receptors will experience additional effects, particularly in relation to views immediately around the stadium, where the new built form will be particularly prominent. In wider views the additional taller built elements will also be more prominent that increase the visual effects.

Scenario's 3&4

Townscape Effects

12.136. The assessment predicts that there will be moderately significant townscape effects during the operational phase on townscape character, urban grain, land use, building heights and site character. The effects are predicted to be beneficial in nature, as the proposals reinforce the townscape characteristics of the site and promote the Stadium as a key landmark sporting venue. There was one moderately significant adverse townscape effect during the construction phase on Site Character, due to a loss of the key Site characteristics and the impact of construction works on the arrival experience into the Stadium through the Site.

12.137. The assessed effects experienced by townscape receptors were greater than those of the Scenario 1 condition, typically increasing in magnitude from negligible to minor. The townscape receptors for Townscape Character, Land Use and Building Heights experienced an increase in significance from not significance to minor significance.

Visual Effects

12.138. There are predicted to be moderately significant adverse effects during the construction phase on a total of 1 views (viewpoints 3). This is primarily due to the sensitivity of the view and the proximity of the Proposed Development to the viewpoint. Construction works will affect the appreciation and character of the view; however, the effects are temporary by their nature.

12.139. No views were predicted to experience adverse effects during the operational phase. This was due to the careful massing of the proposals and visual 'fit' with the existing Stadium. Additional elements extended the influence of this landmark structure, as did the new public realm areas in close range views. View 3 was predicted to experience moderately significant beneficial effects.

12.140. The assessed effects experienced by visual receptors were predicted to be greater than those of the Scenario 1 condition, increasing in magnitude from negligible to minor/moderate. This is due to the proximity and focus of the viewpoints to the Proposed Development, and the relative distance to the committed developments, which inevitably results in greater predicted effects. Views 1,2,4,5,7, 8 & 10 increased to minor significance, whilst view 3 is predicted to experience an increase in effects from not significant to moderately significant.

## Reference List

12.141. This ES Chapter has been prepared by reference to the following:


- Department for Communities and Local Government (2012), National Planning Policy Framework, London, DCLG.
- 1.2 Institute of Environmental Management & Assessment (IEMA), 2015. IEMA Environmental Impact Assessment Guide to Shaping Quality Development.
- 1.3 Landscape Institute, IEMA, 2013. Guidelines for Landscape & Visual Impact Assessment, 3rd Edition, Oxon, Routledge.
- 1.4 Landscape Institute, 2019. Visual Representation of Development Proposals, Landscape Institute Technical Guidance Note 06/11, London, Landscape Institute.
- 1.5 Environmental Impact Assessment EU Directive and UK Regulations, (85/337/EEC).
- 1.6 The Town and Country Planning (Environmental Impact Assessment.)

# 13. Traffic and Transport

## Introduction

13.1. This Chapter of the ES has been prepared by Ove Arup & Partners (Arup) and assesses the likely environmental effects of the Proposed Development with respect to Traffic and Transport impacts of the proposals upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

13.2. This Chapter is accompanied by the following technical appendices:

- Appendix 13.1 Transport Assessment
- Appendix 13.2 Framework Travel Plan
- Appendix 13.3: Scoping Correspondence
- Appendix 13.4: Construction Traffic Data
- Appendix 13.5: Modal Split Note

13.3. This Chapter is also accompanied by the following figures:

- Figure 13.1 Link Reference Plan
- Figure 13.2 Construction Traffic Routes

### 13.1 Technical Competence

| Technical Competence in Traffic and Transport and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Luke Peaker | Peter Webster |
| Company | Ove Arup & Partners | Ove Arup & Partners |
| Qualifications/Accreditations relevant to technical area | BA (Hons) MSc | MEng (Hons) Civil Engineering, Chartered Civil Engineer (CEng) MICE. MCIHT |
| Does the practitioner hold any IEMA qualification? | N/A | N/A |
| Company hold IEMA QMark? | Yes | |
| Years technical experience (in technical area) | 8 | 20 |
| Number of EIA's delivered to date | 5-10 | 20+ |

## Limitations and Assumptions

13.4. The following limitation and assumptions are relevant to the Traffic and Transport Assessment:

- Construction traffic will be assigned to prescribed 'Construction Traffic Routes' located between the site and the Strategic Road Network
- For the purposes of assessment, HGVs are defined as any vehicle with a gross vehicle weight in excess of 3.5t

13.5. This assessment has been undertaken using the material made available by the Applicant and members of their project team, together with other readily available and publicly accessibly material including existing literature and studies, alongside discussions with Manchester City Council (MCC) and Transport for Greater Manchester (TfGM).

13.6. Traffic flow data has been based on traffic survey information collected in 2019 as part of the Co-Op Live arena application (Ref. 126431/FO/2020). Efforts have been made to ensure all information used as a basis for the assessment is accurate and up to date. The use of this data has been discussed and agreed with MCC and TfGM during scoping discussions. There are no known limitations of the underlying information or any constraints that would materially affect the evaluations.

13.7. Assumptions adopted in the evaluation of impacts reported in this chapter are often implicit and rely on expert judgement. Where it has been necessary to make assumptions of where technical deficiencies are known, these have been documented.

## Legislative and Policy Context

### Legislation

### National Planning Policy

13.8. The National Planning Policy Framework (2021) (NPPF), published by the Ministry and Housing, Communities & Local Government (MHCLG) sets out the Government's environmental, economic and social planning policies for England, outlining Government aspiration for sustainable development.

13.9. Section 9 of the NPPF, paragraphs 104 to 113, sets out the approach for promoting sustainable transport. Paragraph 104 sets out that transport issues should be considered from the earliest stages of plan-making and development proposals so that the potential impacts of development on transport networks can be addressed,

13.10. In assessing specific applications of development, paragraph 110 recommends it should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be-or have been- taken up, given the type of development and its location;
b) safe and suitable access to the site can be achieved by all users;
c) the design of streets, parking areas, other transport elements and the content of associated standards reflect current national guidance; and
d) a significant impact from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

13.11. Paragraph 111 outlines that development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

13.12. Within this context, paragraph 112 outlines that applications for development should;

a) give priority first to pedestrian and cycle movements, both within the scheme and neighbouring areas; and second- so far as possible- to facilitating access the high-quality public transport, with

layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;
b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
c) create places that are safe, secure and attractive- which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;
d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and
e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

13.13. In addition, paragraph 113 notes that all developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.

## Sub-Regional Planning Policy

### Transport for the North's Strategic Transport Plan (TfN, 2019)

13.14. Transport for the North (TfN) became England's first Sub-national Transport Body in April 2018. As a partnership, TfN encompasses 20 local transport authorities in Northern England, together with Network Rail and National Highways, to plan and prioritise long-term infrastructure investment in the North.

13.15. TfN published the first iteration on its Strategic Transport Plan (STP) in 2019, setting out proposals for the northern transport network through to 2050.

13.16. TfN's core vision is to have a 'thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all'. In support of this vision, there are four transport objectives;

1. transforming economic performance;
2. increasing efficiency, reliability, integration, and resilience in the transport system;
3. improving inclusivity, health, and access to opportunities for all; and,
4. promoting and enhancing the built, historic and natural environment.

### Places for Everyone (PfE) (GMCA) (Emerging)

13.17. Places for Everyone is the emerging long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. The plan is a joint development plan which will determine the kind of development that takes place in the nine boroughs, maximising the use of brownfield land and urban spaces while protecting Green Belt land from the risk of unplanned development. It also ensures that all new developments are sustainably integrated into Greater Manchester's transport network or supported by new infrastructure.

13.18. Policy JP-Strat 1 highlights a need for a strong focus on growth in the Core Growth Area (CGA). The CGA covers Manchester city centre, the Quays and extends eastwards to include the Etihad Campus and westwards through Trafford Park, The policy seeks to protect the economic role of the CGA with new development support major growth in jobs. Additionally, emphasis is placed the importance of infrastructure relative to the growth of the CGA, in line with the Greater Manchester Transport Strategy 2040 and accompanying Delivery Plans.

13.19. PfE is currently the subject of independent examination, conducted by the Planning Inspectorate.

### Greater Manchester Transport Strategy 2040 (GMTS)

13.20. Greater Manchester Transport Strategy 2040 sets out Greater Manchester's long-term ambition for transport, with a vision for Greater Manchester to have 'world-class connections that support long-term sustainable economic growth and access to opportunity for all'. The Strategy sets out a strong commitment to provide a transport system that;

a) supports sustainable economic growth and the efficient and effective movement of people and goods;
b) improves the quality of life for all by being integrated, affordable and reliable;
c) protects the environment and supports the target to be net zero carbon by 2038 and improve air quality; and
d) capitalises on new technology and innovation.

13.21. Policy 4 of the GMTS sets out TfGM's approach to spatial planning. It highlights the need for TfGM and local planning authorities to continue to work with developers to better integrate transport and new development in accordance with the principles of;

a) reducing the need to travel;
b) reducing the need to travel by car, and the distance travelled;
c) maximising accessibility by sustainable modes;
d) making best use of existing infrastructure, particularly through increasing density of development close to public transport nodes;
e) maximising opportunities to provide additional public transport; and
f) designing to encourage active travel.

## Local Planning Policy

## Manchester City Council Core Strategy (2012)

13.22. The Core Strategy was adopted in 2012 and outlines MCC's vision for development in Manchester until 2027. The Core Strategy forms part of Manchester's Local Development Framework and sets out the planning policies that will be used to support and deliver that vision.

13.23. The development principles of the Strategy seek to maximise the potential of the City's existing infrastructure, promoting walking, cycling and the use of public transport.

13.24. Strategic Objective 2 Economy and the City Centre outlines that the Strategy will support significant further improvement of the City's economic performance and spread the benefits of this growth across the City to reduce economic, environmental and social disparities, and the help create inclusive sustainable communities. Policy EC7 Eastlands Strategic Employment Location outlines that land around the City of Manchester Stadium provides an opportunity for leisure, recreation and entertainment visitor attraction of national significance. In addition, EC7 notes that 'development of complementary commercial uses will be supported, particularly to accommodate economic activities associated with the growth of Manchester City Football Club.' Developments which support the overall vision for the major regeneration initiative of Eastlands will be appropriate, providing they do not prejudice other policies within the plan.

13.25. Proposals at Eastlands will be expected to show how development of the area will:

a) consider the wider design and layout objectives, taking advantage of important frontages such as Alan Turing Way and Ashton New Road;
b) ensure the site is accessible to the East/North Manchester communities by a choice of sustainable and public transport provision; and
c) take advantage of the existing infrastructure on site and proposed improvements such as Metrolink and digital infrastructure.

13.26. In the context of transport, Policy CC5 notes that developers should work with public transport providers to ensure that all users are able to access development by sustainable means, especially taking account of times when developments are likely to be busiest. The Policy notes that proposals that improve pedestrian safety and improve air quality will be supported.

13.27. Strategic Objective 5 of the Core Strategy looks to 'improve the physical connectivity of the City, through sustainable transport networks, the enhance its functioning and competitiveness and provide access to jobs, education, services, retail, leisure and recreation'. Policy T2 outlines the importance of considering accessible areas of opportunity and need. T2 notes that the Council will actively manage the pattern of new development to ensure that it;

a) Located to ensure good access to the City's main economic drivers; and
b) Is easily accessible by walking, cycling and public transport; connecting residents to jobs, centres, health, leisure, open space and educational opportunities.

### Eastlands Regeneration Framework (2017)

13.28. The overall vision for the Etihad Campus is set out in the Eastlands Regeneration Framework. This vision is to develop a place that can successfully host a globally competitive sport, leisure and recreation offer.

13.29. As such the Etihad Campus aims to be:

- The home of a new destination where residents and visitors will come to spend their time on leisure and recreation related activities
- The home of global and national sports organisations which can thrive and develop global best practice. In doing so the Etihad Campus can become the home to new sports related businesses in a new "Sports-Tech" cluster for the city-region
- The home of a Manchester exemplar stimulating a change in behaviours towards the zero-carbon agenda, creating employment opportunities for local people and driving innovation and economic growth across the city.

13.30. The Etihad Campus has the capacity to respond to and host significant new opportunities for a globally competitive leisure and recreation offer. If secured this would deliver key benefits to residents and the wider Greater Manchester economy through investment and jobs.

13.31. In promoting any such opportunity, it is recognised that there must be a robust and comprehensive movement and transport strategy, together with supporting mitigation measures encompassing a range of infrastructure interventions and behavioural changes.

## Assessment Methodology and Significance Criteria

### EIA Scoping

13.32. The proposed scope has been informed by the guidance set out in the following documents:

- Design Manual for Roads and Bridges (DMRB) LA 112, National Highways
- Guidelines for Environmental Impact Assessment Institute for Environmental Management and Assessment (IEMA), 2004
- Guidelines for the Environmental Assessment of Road Traffic (IEMA) (1993).
- Transport Evidence Bases in Plan Making and Decision Making, Ministry of Housing, Communities, and Local Government (MHCLG) (2015).
- Guidance on Travel Plans, Transport Assessments, and Statements, MHCLG, (2014)
- DfT Transport Appraisal Guidance (TAG) UNIT A4.1 Social Impact Appraisal
- DMRB Volume 11, Section 2, Part 5 , National Highways (Withdrawn)
- DMRB LA104: Environmental assessment and Monitoring Rev 1, National Highways

13.33. The scope of this Chapter has also been informed by scoping discussions held with MCC and TfGM with regard to the TA, and the scope of assessment and outcomes of the ES prepared for the Co-op Live Arena planning application (Ref. 126431/FO/2020).

13.34. Consultation undertaken in preparation of this Chapter and supporting appendices is summarised in Table 13.2 below.

Table 13.2 Summary of Scoping for the Traffic and Transport Chapter

| Consultee (Body/Organisation) | Role | Date and Form of Consultation | Summary and Outcome of Consultation |
|---|---|---|---|
| Manchester City Council | Highways Authority | Virtual Meeting (Microsoft Teams) 18th October 2022 1400-1500 | Arup outline the proposed scope for the Transport Assessment (TA). Arup to issue a Scoping Note to MCC/TfGM. |
| Transport for Greater Manchester | Government Body – Transport Strategy | | |
| Manchester City Council | Highways Authority | Scoping Note Issued Via Email Friday 21st October. | Arup set out proposed scope of TA based on the discussions held during the meeting of 18th October. |
| Transport for Greater Manchester | Government Body – Transport Strategy | | |
| Manchester City Council | Highways Authority | TA Scoping Response received 10th November | Presented in **Annex A** of the Transport Assessment (**Appendix 13.1**) |
| Transport for Greater Manchester | Government Body – Transport Strategy | | |
| Manchester City Council | Planning and Highways Authority | EIA Scoping Report | The project team Issued the EIA Scoping Report on **6th April 2023.** |
| Manchester City Council | Planning and Highways Authority | Response to EIA Scoping Report received 12th April 2023. | Transport Assessment (Appendix 13.1) updated to reflect comments received. MCC response presented in Appendix 13.3. |

## Baseline Study Methodology

13.35. The existing baseline year is 2023, which represents the date during which the planning application has been prepared. The year of opening for the Proposed Development is assumed to be 2026, in line with the Construction Programme set out in Chapter 5: Construction Methodology.

13.36. The construction assessment has been undertaken for 2024 as this is expected to be the peak construction year for the Proposed Development.

13.37. In accordance with the IEMA guidelines, the study area has been defined by identifying any road link where it is felt that potentially significant environmental effects may occur as a result of the Proposed Development in relation to Traffic and Transport.

13.38. Baseline conditions have been established using data collected as part of the 2020 Co-op Live Planning Application. The following data has been considered:

- Automatic traffic counts (ATC's) were undertaken on Tuesday 29th October 2019 and Tuesday 26th November 2019 as well as a further seven days commencing Saturday 2nd November 2019.
- Road traffic collision data for the most recent five years to 2022 and presented in the TA.

13.39. TEMPro growth factors have been applied to the 2019 data to provide the 2022 baseline traffic flow data. Further information is provided in the TA (Appendix 13.1).

13.40. The future baseline includes projections from the Co-op Live Arena traffic, which is based on 120 events in the first year of operation (2024), with the number of events expected to increase up to around 160 events by 2026.

## Summary of Assessment Approach

13.41. The potential effects of both construction traffic and operational traffic have been assessed in this Chapter of the ES. The potential effects have been assessed by comparing the likely trip generation of both construction and operation of the Proposed Development with future baseline traffic flows. Percentage increases are then determined and compared against magnitude criteria. This process is summarised below.

- Identify receptors, determine link sensitivities, and forecast future baseline traffic flows
- Forecast future baseline traffic flows + development
- Determine percentage increases arising from development traffic and identify associated magnitude for each potential environmental effect.
- Compare link sensitivity against magnitude of impacts
- Identify significance of effects

13.42. The scope of this assessment has been determined based on the IEMA Guidelines (Section 3: Traffic Impact Analysis), which indicate that roads should be included where traffic flows are predicted to increase by more than 30%, unless the road in question is located within a specifically sensitive area. In the latter case, links should be included where traffic flows are forecast to increase by 10% or more.

13.43. The assessment of likely significant effects to sensitive receptors considers the sensitivity of the receptor (on a scale of high, medium, low and negligible) and the magnitude of change (on a scale of large, medium, small and negligible) to determine the level of effect on a scale of major, moderate, minor and negligible.

13.44. In order to complete the assessment, the following have therefore been established:

- baseline traffic flows/ transport conditions;
- construction and operational traffic generated by the Proposed Development (i.e., Magnitude of Change); and
- highway link sensitivities (based on type, volume, and sensitivity, of individual receptors adjacent to links).

13.45. For the operational phase, and in accordance with IEMA Guidelines, the study area is defined by identifying any road link where it is felt that potentially significant effects may occur as a result of the Proposed Development.

13.46. For the construction phase, all HGV traffic would be required to adhere to prescribed 'Construction Traffic Routes'; defined between the site and the strategic road network (SRN) i.e., M60. The assessment consider increases in traffic associated with the construction phase along all road links within the study area comprising construction traffic routes.

13.47. The following data has been used in preparation of this Chapter:

- 2019 Traffic Survey Data (manual classified counts) used to inform the Coop Live planning application;
- we have liaised with MCC and TfGM to agree appropriate growth factors to be applied to these surveyed traffic flows in order to reflect any changes to traffic patterns that may have occurred since this time. These factors have been based upon locally based evidence using TfGM-held survey data for the local network;
- DfT Countpoint Data Sites;
- CrashMap Database Personal Injury Accident (PIA) Data;
- local, regional, and national planning policy documents; and
- discussions with MCC/ TfGM.

## Potential Effects Relating to Traffic and Transport

- The following receptors have been identified as having the potential to be subject to likely significant effects: **Severance, Driver delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, and Highway Safety.**
- The assessment of severance, pedestrian amenity, fear and intimidation and accidents and safety is based on the change in total traffic flow (or HGVs) while driver delay and pedestrian delay is assessed considering the change in total traffic flow on the roads concerned in the area of study.
- The assessment identifies the requirements for any mitigation measures during construction that may require incorporation into the design of the development.
- During the construction phase, mitigation is likely to comprise appropriate construction management measures and controls. Potential residual effects and the likelihood of occurrence of these effects, and residual uncertainties will be considered following mitigation. These are presented in terms of significance and magnitude.
- The effects of traffic resulting from the operation of the Proposed Development are assessed in consideration of the predicted net change in traffic flows.
- For robustness, the chapter assesses the impacts of 'peak month' and 'average peak year' construction traffic flows to consider fluctuations in the intensity of construction activity, and associated volumes of traffic generated.
- The potential significant effects relevant to Traffic and Transport are summarised in Table 13.3 below.

Table 13.3 Potential Effects Relating to Traffic and Transport

| Effect | Receptor | Applicable Development Phase (C / O) |
|---|---|---|
| Severance | Pedestrians, Cyclists, People at Home, People at Work | C |
| | | O |
| Driver Delay | Car Drivers/ Passengers, Bus Services | C |

| | | |
|---|---|---|
| | | O |
| Pedestrian and Cyclist Delay | Pedestrians, Cyclists | C |
| | | O |
| Pedestrian and Cyclist Amenity | Pedestrians, Cyclists | C |
| | | O |
| Fear and Intimidation | Pedestrians, Cyclists, People at Home, People at Work | C |
| | | O |
| Highway Safety | Car Drivers/Passengers, Bus Services, Pedestrians, Cyclists, Metrolink Users, Equestrians | C |
| | | O |

## Assessment of Effects

13.48. In assessing the environmental effects of traffic and transport, two factors are considered. Firstly, the sensitivity of receptors with the study area and secondly the anticipated magnitude of change/impact.

13.49. The two above factors are then combined to give an effect significance that depends on the sensitivity on the receptor and the anticipated magnitude change.

## Magnitude of Change

13.50. The magnitude of these effects will be assessed on the basis of the thresholds set out in Table 13.4:

Table 13.4 Magnitude Criteria

| Subject | Magnitude of Impact | | | |
|---|---|---|---|---|
| | High | Moderate | Low | Negligible |
| **Severance -** results from the creation of new barriers such as roads combined with increased traffic flow along existing routes. | People are likely to be deterred from making pedestrian journeys to an extent sufficient to induce a reorganisation of their activities. Those who do make the journey on foot will experience considerable hindrance.<br><br>Change in total traffic flows (or HGVs) of >90%. | Some people, particularly elderly people and children may be dissuaded from making a journey on foot. For others, pedestrian journey will be longer or less attractive.<br><br>Change in total traffic flows (or HGVs) of 60-90%. | All people wishing to make pedestrian movements will be able to do so, but there will probably be some hindrance to movement.<br><br>Change in total traffic flows (or HGVs) of 30-60%. | Little or no hindrance to pedestrian movement.<br><br>Change in total traffic flows (or HGVs) of <30%. |

| Subject | Magnitude of Impact | | | |
|---|---|---|---|---|
| | High | Moderate | Low | Negligible |
| **Driver Delay -** often caused by the impact of the works on the local road network, along with increases in overall traffic flow along existing routes. | Delay may have a major effect on journey times. The magnitude of delay is such that drivers may choose alternative route or time for their journey or may decide not to make journey at all.<br><br>Change in total traffic flows of >30%. | Delay may have a noticeable effect on journey times but is unlikely to cause drivers to choose alternative route or time for their journey.<br><br>Change in total traffic flows of 20-30%. | A measurable and perceptible change in driver delay. Unlikely to affect overall journey times.<br><br>Change in total traffic flows of 10-20%. | Little or no change in delays to drivers.<br><br>Change in total traffic flows of <10%. |
| **Pedestrian Delay –** results from increases in traffic flow, speed or composition along existing routes. | Delay may have a major effect on journey times. The magnitude of delay is such that pedestrians may choose alternative route or time for their journey or may decide not to make journey at all.<br><br>Change in total traffic flows of >90%. | Delay may have a noticeable effect on journey times but is unlikely to cause pedestrians to choose alternative route or time for their journey.<br><br>Change in total traffic flows of 60-90%. | A measurable and perceptible change in pedestrian delay.<br><br>Change in total traffic flows of 30-60%. | Little or no change in delays to pedestrians.<br><br>Change in total traffic flows of <30%. |
| **Pedestrian Amenity –** relates to the relative pleasantness of a journey and can be affected by increases in traffic. | The magnitude of change in the pleasantness of journeys made by foot or cycle is such that pedestrians and cyclists may choose alternative route or may decide not to make journey at all.<br><br>Change in total traffic flows (or HGVs) of >90%. | Change in the pleasantness of journeys made by foot or cycle may have a noticeable effect but is unlikely to cause pedestrians or cyclists to choose alternative route for their journey.<br><br>Change in total traffic flows (or HGVs) of 60-90%. | A measurable and perceptible change in the pleasantness of journeys made by foot or cycle.<br><br>Change in total traffic flows (or HGVs) of 30-60%. | Little or no change in the pleasantness of journeys made by foot or cycle.<br><br>Change in total traffic flows (or HGVs) of <30%. |
| **Fear and Intimidation -** a pedestrian's level of fear and intimidation is linked to the volume of traffic on the local road network. | Change in the level of intimidation experienced by pedestrians due to road traffic, particularly HGVs may be such that pedestrians choose alternative route or may decide not to make journey at all. | Change in the level of intimidation experienced by pedestrians due to road traffic, particularly HGVs may have a noticeable effect but is unlikely to cause pedestrians to choose alternative route for their journey. | A measurable and perceptible change in level of intimidation experienced by pedestrians due to road traffic, particularly HGVs.<br><br>Change in total traffic flows (or HGVs) of 30-60%. | Little or no change in the level of intimidation experienced by pedestrians due to road traffic, particularly HGVs. |

| Subject | Magnitude of Impact | | | |
|---|---|---|---|---|
| | High | Moderate | Low | Negligible |
| | Change in total traffic flows (or HGVs) of >90%. | Change in total traffic flows (or HGVs) of 60-90%. | | Change in total traffic flows (or HGVs) of <30%. |
| Highway Safety | Change in total traffic flows (or HGVs) of >90%. | Change in total traffic flows (or HGVs) of 60-90%. | Change in total traffic flows (or HGVs) of 30-60%. | Change in total traffic flows (or HGVs) of <30%. |
| | A qualitative assessment based on historical accident trends over the last five years. | | | |

### Receptor Sensitivity

13.51. The sensitivity of a receptor can be defined by the degree to which it responds to a change in its environment. Within the IEMA guidance, the following groups of people or places are identified as being susceptible to changes in traffic conditions:

- people at home;
- people at work;
- children, elderly, and disabled persons;
- sensitive locations such as hospitals, churches, schools, historical buildings
- pedestrians;
- cyclists;
- open recreational spaces;
- site of ecological/ nature conservation value; and
- sites of tourist/ visitor attraction.

13.52. Table 13.5 summarises a range of receptors and their sensitivity to increases in road traffic.

Table 13.5: Example Receptors and their Sensitivities

| Example Receptors | Sensitivity |
|---|---|
| Schools, colleges, playgrounds, accident black spots, retirement homes, urban/residential roads without footways that are used by pedestrians. | High |
| Congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycleways, community centres, parks and recreation facilities | Moderate |
| Sites of tourist/visitor attraction, places of worship, residential areas set back from the highway with screening | Low |

| Example Receptors | Sensitivity |
|---|---|
| Public open spaces, nature conservation areas and residential areas with adequate footway provision. | Negligible |

### Identified Receptors and their Sensitivity

13.53. An audit has been undertaken of the highway network surrounding the site, considering the receptors located on each link and their associated sensitivity to changes in traffic volumes as a consequence of the Proposed Development.

13.54. The list of links and their sensitivity is summarised in Table 13.6. Where links have been identified has having a moderate or high sensitivity and explanation is provided.

Table 13.6 Link Sensitivities

| Link Reference | Receptor | Sensitivity | Rationale |
|---|---|---|---|
| 1 | A6010 Queens Road (South of Sedgeford Road) | Low | - |
| 2 | A6010 Hulme Hall Road (North of Vickers Street) | Low | - |
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | Low | - |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | Low | - |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | Low | - |
| 6 | A62 Oldham Road (East of Alan Turing Way) | Low | - |
| 7 | A62 Oldham Road (West of Alan Turing Way) | Low | - |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | Moderate | Shopping areas with roadside frontage |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | Moderate | Un-segregated cycleways |

| Link Reference | Receptor | Sensitivity | Rationale |
|---|---|---|---|
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | High | School (Varna Community Primary) |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | Moderate | Un-segregated cycleways |
| 12 | Gibbon Street East | Low | - |
| 13 | Stuart Street | Low | - |
| 14 | Welcomb Street | Low | - |
| 15 | A665/ Great Ancoats Street | Moderate | Shopping areas with roadside frontage |
| 16 | A6 Stockport Road (South) | Moderate | Shopping areas with roadside frontage, doctors' surgeries, community centres |
| 17 | Bradford Road (West of Saxon Street) | Low | - |
| 18 | Briscoe Lane (west of Riverpark Road) | Low | - |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | Low | - |
| 20 | A622 Ashton New Road (East of Linfield Street) | Low | - |
| 21 | A635 Ashton Old Road(West of Louisa Street) | Low | - |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | Low | - |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | Low | - |

## Significance Evaluation

13.55. The significance of the effect is determined based on comparison against the magnitude of impact and sensitivity of the receptor. This is summarised in Table 13.7.

Table 13.7: Significance Criteria

| Magnitude | Sensitivity | | | |
|---|---|---|---|---|
| | High | Moderate | Low | Negligible |
| High | Major | Major | Moderate | Minor |
| Moderate | Major | Moderate | Minor | Negligible |
| Low | Moderate | Minor | Negligible | Negligible |
| Negligible | Minor | Negligible | Negligible | Negligible |

## Baseline Conditions

13.56. This section provides an overview of the baseline conditions relevant to Traffic and Transport.

13.57. The site forms part of the Etihad Campus; comprising a range of facilities including the Etihad Stadium, Manchester City Football Academy, National Squash Centre, Tennis Centre, and Regional Arena, amongst others. Owing to the variety and nature of these uses, the area is subject to daily operational traffic (including staff, visitor and servicing traffic) but also peaks in traffic associated with matchdays and other events. Activity relating to traffic and transport is therefore influenced by the timing and frequency of events within the overall schedule for the site and is subject to careful co-ordination and management by Manchester City Football Club, its partners, and key stakeholders including MCC, TfGM and Metrolink.

13.58. The area is surrounded by a number of heavily trafficked routes including the A6010 Alan Turing Way, A662 Ashton New Road, A635 Ashton Old Road, A62 Oldham Road. These routes link the site to the Strategic Road Network (M60) and Manchester City Centre and the Inner Ring Road, and radial connections from the city centre towards other regional destinations. The local area is also comprised of a number of residential areas served by more lightly trafficked local distributor and access roads. Furthermore, there are commercial properties in the surrounding communities including warehousing, industrial sites, and local shops and services. The sensitivity of these receptors to increases in road traffic flows is dependent on the type and number of receptors located along each road link.

13.59. The site also benefits from strong connections to a range of public transport modes including Metrolink, multiple bus routes, matchday/ event day shuttle buses, and local rail at Ashburys Station. In addition, to the west, Manchester Piccadilly station (and the wider city centre) is within walking and cycling distance of the site for onwards national and regional rail connections. There are many walking and cycling routes available locally including via the Ashton Canal (National Cycle Route 86) linking to the city centre and Alan Turing Way (National Cycle Route 60).

13.60. The Proposed Development will lead to a permanent increase in multi-modal transport demand during the operational phase, including to Annual Average Daily Traffic (AADT) flows in the surrounding roads. It is anticipated that this would primarily be cars and servicing vehicles (i.e., Light Goods Vehicles (LGVs). Temporary increases in both Heavy Goods Vehicles (HGVs) and LGVs are anticipated during the construction phase of the Proposed Development.

13.61. In the event that the Proposed Development did not come forward, traffic flows on the surrounding roads are anticipated to increase due to the impact of background growth and the trips generated by nearby committed development associated with the growth aspirations for the Etihad Campus (as set out in the Strategic Vision and associated TA) including the operational phase of the Co-op Live arena.

13.62. In 2014 planning consent was granted to expand the Etihad Stadium to provide an additional 12,500 seats. (Planning Ref. 104315/FO/2013/N2). This consent has been partially implemented through the expansion of the South Stand by 6,250 seats. The permission for an additional 6,250 seats in the North Stand is consented bus it yet to be implemented. Upon implementation this will increase the capacity of the stadium to 61,250 people. This is therefore the 'approved base case' against which future development should be considered and assessed.

13.63. The approved transport strategy for the consented stadium is based upon a modal shift in which any trips that are new to the network will be encouraged by a variety of measures to use sustainable modes of transport such as public transport, walking, and cycling. Surveys undertaken as part of this work, supported by data from previous studies, indicates that this is being achieved and, since the surveys undertaken as part of the 2014 application, recorded car numbers on site have reduced.

13.64. The overarching aim of the transport strategy for the stadium expansion is to maintain and not increase existing levels of parking. New journeys generated by the stadium expansion would use alternative modes to the car. No additional parking supply, junction capacity improvements, or other schemes that might encourage additional traffic are proposed as part of the strategy.

13.65. Given that the expansion of the stadium is approved and there is an existing permission that could be implemented (at a greater capacity than sought by this permission) this assessment has considered only the additional new elements (commercial and hotel uses) when compared to the 2014 permission.

## 2023 Baseline Traffic Flows (AADT)

13.66. The 2023 baseline traffic flows are presented in Table 13.8. Traffic flows are presented in AADT for both total vehicular traffic and HGVs. Traffic flows in 2023 include the co-op live arena operational traffic, assuming 120 events per year.

Table 13.8: 2023 Baseline

| Link Reference | Highway Link | 2023 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 1 | A6010 Queens Road (South of Sedgeford Road) | 20,181 | 1,594 |
| 2 | A6010 Hulme Hall Road (North of Vickers Street) | 21,101 | 2,173 |
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 33,572 | 3,357 |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 31,163 | 3,428 |

| Link Reference | Highway Link | 2023 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 29,176 | 3,005 |
| 6 | A62 Oldham Road (East of Alan Turing Way) | 25,708 | 2,545 |
| 7 | A62 Oldham Road (West of Alan Turing Way) | 23,388 | 2,175 |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 20,525 | 1,519 |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | 18,232 | 1,386 |
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 26,434 | 2,802 |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 24,188 | 2,733 |
| 12 | Gibbon Street East | 14,422 | 534 |
| 13 | Stuart Street | 5,275 | 158 |
| 14 | Welcomb Street | 1,925 | 323 |
| 15 | A665/ Great Ancoats Street | 33,192 | 765 |
| 16 | A6 Stockport Road (South) | 18,862 | 885 |
| 17 | Bradford Road (West of Saxon Street) | 12,896 | 916 |
| 18 | Briscoe Lane (west of Riverpark Road) | 16,813 | 1,345 |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 29,418 | 3,530 |

| Link Reference | Highway Link | 2023 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 20 | A622 Ashton New Road (East of Linfield Street) | 15,195 | 1,261 |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 25,200 | 2,167 |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 29,551 | 2,926 |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 14,282 | 1,243 |

## 2024 Future Baseline Traffic Flows

13.67. The peak year of construction traffic for the Proposed Development is anticipated to be 2024. This therefore forms the future baseline year for the construction assessment. The future baseline considers changes in traffic flows that would come forward without the Proposed Development.

13.68. The 2024 future baseline flows are presented in Table 13-9. Traffic flows are presented in AADT for both total vehicular traffic and HGVs.

Table 13.9: 2024 Future Baseline Traffic Flows (AADT)

| Link Reference | Highway Link | 2024 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 1 | A6010 Queens Road (South of Sedgeford Road) | 20,437 | 1,615 |
| 2 | A6010 Hulme Hall Road (North of Vickers Street) | 21,369 | 2,201 |
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 33,998 | 3,400 |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 31,558 | 3,471 |

| Link Reference | Highway Link | 2024 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 29,546 | 3,043 |
| 6 | A62 Oldham Road (East of Alan Turing Way) | 26,034 | 2,577 |
| 7 | A62 Oldham Road (West of Alan Turing Way) | 23,685 | 2,203 |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 20,785 | 1,538 |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | 18,463 | 1,403 |
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 26,769 | 2,838 |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 24,495 | 2,768 |
| 12 | Gibbon Street East | 14,605 | 540 |
| 13 | Stuart Street | 5,342 | 160 |
| 14 | Welcomb Street | 1,949 | 328 |
| 15 | A665/ Great Ancoats Street | 33,613 | 775 |
| 16 | A6 Stockport Road (South) | 19,101 | 896 |
| 17 | Bradford Road (West of Saxon Street) | 13,060 | 927 |
| 18 | Briscoe Lane (west of Riverpark Road) | 17,026 | 1,362 |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 29,791 | 3,575 |

| Link Reference | Highway Link | 2024 Baseline Traffic Flows (AADT) | |
|---|---|---|---|
| | | Total Vehs | HGVs |
| 20 | A622 Ashton New Road (East of Linfield Street) | 15,388 | 1,277 |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 25,520 | 2,195 |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 29,926 | 2,963 |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 14,463 | 1,258 |

### 2026 Future Baseline Traffic Flows (AADT)

13.69. The year of opening for the Proposed Development is assumed to be 2026. This therefore forms the future baseline year for the operational assessment. The future baseline considers changes in traffic flows that would come forward without the Proposed Development.

13.70. In this location, the significant contributor to changes in traffic flows from the 2022 baseline is the traffic associated with the Co-op Live development. The future baseline includes an assumption of around 160 events taking place per year at the arena.

13.71. The 2026 future baseline traffic flows are presented in Table 13.10. Traffic flows are presented in AADT for both total vehicular traffic and HGVs.

## Identification and Evaluation of Significant Effects

### Magnitude of Change/ Impact: Construction

13.72. The construction of the Proposed Development will lead to additional construction vehicle movements on the highway network. The Construction Methodology chapter (Chapter 5) sets out the programme of works together with the anticipated timing and management for the construction activities. The assessment has been completed assuming that the measures outlined in the Chapter will be 'embedded' mitigation).

13.73. Construction traffic would comprise the movement of staff, deliveries, and movement of construction materials, including waste and excavated material. Construction traffic estimates have been provided by the project team based on the construction programme presented in Chapter 5: Construction Methodology.

13.74. Construction traffic has been assigned to construction traffic routes (Figure 13.2), following the approved routing agreed as part of the Co-op Live Arena application. The traffic forecasts therefore assume that HGV traffic for the Proposed Development will follow these prescribed routes, as embedded mitigation, to minimise the likelihood of adverse environmental effects of additional HGV traffic on less-suitable routes.

13.75. In accordance with IEMA Guidelines, a 30% increase in traffic (or 10% on roads identified as being sensitive) would trigger the need to assess the environmental effects associated with traffic and transport. The identified links shown to have an increase in construction traffic as a consequence of the Proposed Development are presented in Table 13.11.

Table 13.11: Magnitude of Change: Construction

| Link Reference | Highway Link | AADT Traffic Flows | | | | |
|---|---|---|---|---|---|---|
| | | 2024 Baseline | Increase in Construction Traffic | | | |
| | | Total Vehs | Total Vehs | Of Which HGV | % Increase | % Increase HGV |
| 1 | A6010 Queens Road (South of Sedgeford Road) | 20,437 | 39 | 16 | 0.19% | 0.99% |
| 2 | A6010 Hulme Hall Road (North of Vickers Street) | 21,369 | 142 | 32 | 0.67% | 1.45% |
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 33,998 | 239 | 36 | 0.70% | 1.05% |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 31,558 | 197 | 26 | 0.63% | 0.75% |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 29,546 | 197 | 26 | 0.67% | 0.85% |
| 6 | A62 Oldham Road (East of Alan Turing Way) | 26,034 | 23 | 16 | 0.09% | 0.62% |

| Link Reference | Highway Link | AADT Traffic Flows | | | | |
|---|---|---|---|---|---|---|
| | | 2024 Baseline | Increase in Construction Traffic | | | |
| | | Total Vehs | Total Vehs | Of Which HGV | % Increase | % Increase HGV |
| 7 | A62 Oldham Road (West of Alan Turing Way) | 23,685 | 3 | 0 | 0.01% | 0.00% |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 20,785 | 45 | 10 | 0.22% | 0.65% |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | 18,463 | 3 | 0 | 0. 02% | 0.00% |
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 26,769 | 67 | 13 | 0.25% | 0.46% |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 24,495 | 60 | 0 | 0.25% | 0.00% |
| 12 | Gibbon Street East | 14,605 | 0 | 0 | 0.00% | 0.00% |
| 13 | Stuart Street | 5,342 | 0 | 0 | 0.00% | 0.00% |
| 14 | Welcomb Street | 1,949 | 0 | 0 | 0.00% | 0.00% |
| 15 | A665/ Great Ancoats Street | 33,613 | 2 | 0 | 0.00% | 0.00% |
| 16 | A6 Stockport Road (South) | 19,101 | 76 | 13 | 0.40% | 1.43% |
| 17 | Bradford Road (West | 13,060 | 0 | 0 | 0.00% | 0.00% |

| Link Reference | Highway Link | AADT Traffic Flows | | | | |
|---|---|---|---|---|---|---|
| | | 2024 Baseline | Increase in Construction Traffic | | | |
| | | Total Vehs | Total Vehs | Of Which HGV | % Increase | % Increase HGV |
| | of Saxon Street) | | | | | |
| 18 | Briscoe Lane (west of Riverpark Road) | 17,026 | 0 | 0 | 0.00% | 0.00% |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 29,791 | 67 | 13 | 0.22% | 0.36% |
| 20 | A622 Ashton New Road (East of Linfield Street) | 15,388 | 45 | 10 | 0.29% | 0.78% |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 25,520 | 67 | 13 | 0.26% | 0.59% |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 29,926 | 67 | 0 | 0.22% | 0.00% |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 14,463 | 3 | 0 | 0.02% | 0.00% |

13.76. The maximum increase in AADT traffic flows on highway links comprising construction traffic routes is 0.67%. Maximum anticipated increases in HGV traffic on links comprising construction traffic routes is 1.45%. Therefore, based on the IEMA Guideline thresholds, the magnitude of change can be considered negligible. On this basis anticipated environmental effects would also be considered negligible.

## Magnitude of Change/ Impact: Operation

13.77. The effect on the local highway network in 2026 (assumed year of opening for the Proposed Development) is presented in Table 10. This shows the percentage increase in flows against the 2026 future baseline, as a result of the Proposed Development.

13.78. In accordance with IEMA Guidelines, a 30% increase in traffic (10% on roads identified as being sensitive) would trigger the need to assess the environmental effects associated with traffic and transport. The identified links shown to have an increase in operational traffic as a consequence of the Proposed Development are presented in Table 13.12.

Table 13.12: Magnitude of Change: Operation

| Link Reference | Highway Link | AADT Traffic Flows | | |
|---|---|---|---|---|
| | | 2026 Baseline | Increase in Development Traffic | |
| | | Total Vehs | Total Vehs | % Increase |
| 1 | A6010 Queens Road (South of Sedgeford Road) | 21055 | 248 | 1.2% |
| 2 | A6010 Hulme Hall Road (North of Vickers Street) | 22285 | 428 | 1.9% |
| 3 | A6010 Alan Turing Way (South of Gibbon Street) | 35402 | 1096 | 3.1% |
| 4 | A6010 Alan Turing Way (South of Ashton New Road) | 32724 | 899 | 2.7% |
| 5 | A6010 Alan Turing Way (North of Ashton Old Road) | 31604 | 899 | 2.8% |
| 6 | A62 Oldham Road (East of Alan Turing Way) | 26775 | 165 | 0.6% |
| 7 | A62 Oldham Road (West of Alan Turing Way) | 24308 | 16 | 0.1% |
| 8 | A662 Ashton New Road (East of Alan Turing Way) | 21332 | 189 | 0.9% |

| Link Reference | Highway Link | AADT Traffic Flows | | |
|---|---|---|---|---|
| | | 2026 Baseline | Increase in Development Traffic | |
| | | Total Vehs | Total Vehs | % Increase |
| 9 | A662 Ashton New Road (West of Alan Turing Way) | 18959 | 17 | 0.1% |
| 10 | A635 Ashton Old Road (East of Alan Turing Way) | 27454 | 291 | 1.1% |
| 11 | A635 Ashton Old Road (West of Alan Turing Way) | 25129 | 321 | 1.3% |
| 12 | Gibbon Street East | 14989 | 0 | 0.0% |
| 13 | Stuart Street | 5459 | 0 | 0.0% |
| 14 | Welcomb Street | 1992 | 0 | 0.0% |
| 15 | A665/ Great Ancoats Street | 34549 | 15 | 0.0% |
| 16 | A6 Stockport Road (South) | 19306 | 96 | 0.5% |
| 17 | Bradford Road (West of Saxon Street) | 13451 | 42 | 0.3% |
| 18 | Briscoe Lane (west of Riverpark Road) | 17504 | 63 | 0.4% |
| 19 | A6010 Pottery Lane (north of Ambrose Street) | 31393 | 310 | 1.0% |
| 20 | A622 Ashton New Road (East of Linfield Street) | 15945 | 189 | 1.2% |
| 21 | A635 Ashton Old Road(West of Louisa Street) | 26033 | 291 | 1.1% |

| Link Reference | Highway Link | AADT Traffic Flows | | |
|---|---|---|---|---|
| | | 2026 Baseline | Increase in Development Traffic | |
| | | Total Vehs | Total Vehs | % Increase |
| 22 | A635 Ashton Old Road (east of Lime Bank Street) | 31160 | 321 | 1.0% |
| 23 | A662 Ashton New Road (west of Hillkirk Street) | 15247 | 18 | 0.1% |

13.79. Table 13.11 shows that the change in total vehicles is less than 5% on all links. Therefore based on the IEMA Guideline thresholds, the magnitude of change can be considered negligible. On this basis anticipated environmental effects would also be considered negligible.

## Severance

13.80. Total changes in AADT and HGVs are forecast to be less than 30% (or 10% on sensitive links) on all links. On that basis anticipated environmental effects with regard to Severance are considered to be negligible.

## Driver Delay

13.81. The change in total traffic flows on all links is less than 10% for both construction and operation scenarios. Therefore based on the IEMA Guideline thresholds, the magnitude of change can be considered negligible. On this basis anticipated driver delay would also be considered negligible.

13.82. Notwithstanding that, the Transport Assessment (Appendix 13.1) considers the impact of the Proposed Development at the nearby junctions;

## Pedestrian and Cyclist Delay

13.83. Total changes in AADT and HGVs are forecast to be less than 30% (or 10% on sensitive links) on all links. On that basis anticipated environmental effects with regard to Pedestrian and Cyclist Delay are considered to be negligible.

## Pedestrian and Cyclist Amenity

13.84. Total changes in AADT and HGVs are forecast to be less than 30% (or 10% on sensitive links) on all links. On that basis anticipated environmental effects with regard to Pedestrian and Cyclist Amenity are considered to be negligible.

## Fear and Intimidation

13.85. Total changes in AADT and HGVs are forecast to be less than 30% (or 10% on sensitive links) on all links. On that basis anticipated environmental effects with regard to Fear and Intimidation are considered to be negligible.

## Highway Safety

13.86. Notwithstanding the above, potential effects with regard to Highway Safety are considered in further detail within the Transport Assessment (Appendix 13.1).

## Mitigation Measures

13.87. No significant effects are anticipated to arise as a consequence of the operational phase of the Proposed Development. As a consequence, no specific mitigation is considered to be required. The Transport Assessment (Appendix 13.1) details measures proposed to encourage modal shift amongst supporters. The Framework Travel Plan (Appendix 13.2) sets out measures to reduce the volume of car trips associated with the Proposed Development during operation.

13.88. Other than the measures contained within the Construction Logistics Plan / Construction Traffic Management plan, no further mitigation is proposed with regard to construction traffic.

### 2014 Extant Consent

13.89. In 2014 planning consent was granted to expand the Etihad Stadium to provide an additional 12,500 seats. (Planning Ref. 104315/FO/2013/N2). This consent has been partially implemented through the expansion of the South Stand by 6,250 seats. The permission for an additional 6,250 seats in the North Stand is consented bus it yet to be implemented. Upon implementation this will increase the capacity of the stadium to 61,250 people. This is therefore the 'approved base case' against which future development should be considered and assessed.

13.90. The approved transport strategy for the consented stadium is based upon a modal shift in which any trips that are new to the network will be encouraged by a variety of measures to use sustainable modes of transport such as public transport, walking, and cycling. Surveys undertaken as part of this work, supported by data from previous studies, indicates that this is being achieved and, since the surveys undertaken as part of the 2014 application, recorded car numbers on site have reduced.

13.91. The overarching aim of the transport strategy for the stadium expansion is to maintain and not increase existing levels of parking. New journeys generated by the stadium expansion would use alternative modes to the car. No additional parking supply, junction capacity improvements, or other schemes that might encourage additional traffic are proposed as part of the strategy.

13.92. Given that the expansion of the stadium is approved and there is an existing permission that could be implemented this assessment has considered only the additional new elements (commercial and hotel uses) when compared to the 2014 permission.

## Cumulative Effects

13.93. The construction of the scheme in combination with other committed developments in the area could create short term disruption to road users with temporary closures/diversions and increased driver stress as a result of delays caused by traffic management and diversions. It is assumed that all committed developments would be required to operate with a CEMP to mitigate environmental impacts and with such mitigation in place, the significance of the cumulative temporary effects in relation to severance, pedestrian and cycle delay and amenity, driver delay and highway safety on local roads is considered to be negligible.

## Residual Effects

13.94. Table 13.13 summarises the effects of the Proposed Development during construction and operation. It is considered that there would be no significant residual effects arising from the Proposed Development in relation to Traffic and Transport.

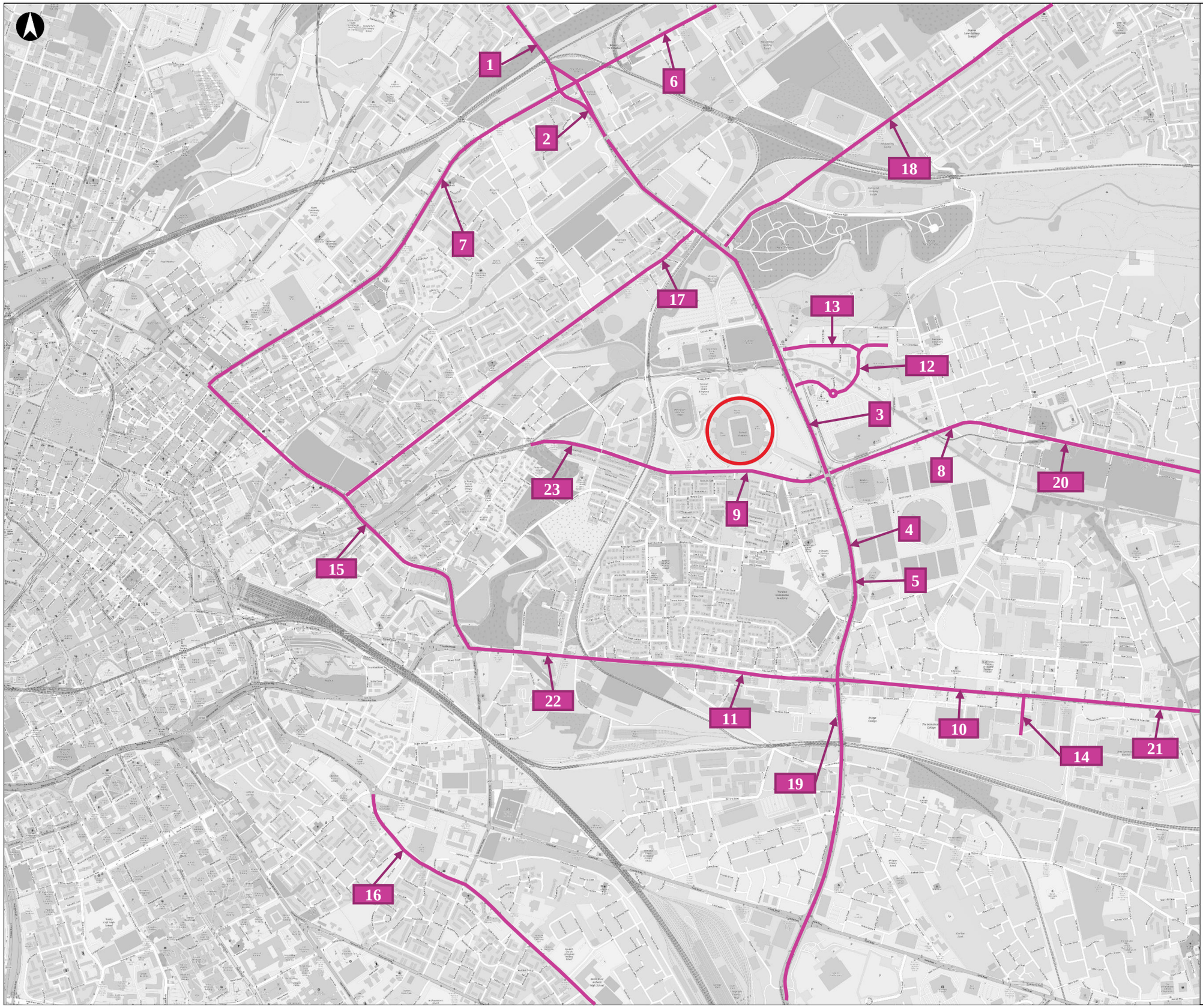
Table 13.13 Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **Highway Links** | Negligible | Construction and Environmental Management Plan (CEMP) | Negligible |
| **Operational** | | | |
| **Highway Links** | Negligible | Framework Travel Plan | Negligible |

## Reference List

This ES Chapter has been prepared by reference to the following:


- Design Manual for Roads and Bridges (DMRB) LA 112, National Highways
- Guidelines for Environmental Impact Assessment Institute for Environmental Management and Assessment (IEMA), 2004
- Guidelines for the Environmental Assessment of Road Traffic (IEMA) (1993).
- Transport Evidence Bases in Plan Making and Decision Making, Ministry of Housing, Communities, and Local Government (MHCLG) (2015).
- Guidance on Travel Plans, Transport Assessments, and Statements, MHCLG, (2014)
- DfT Transport Appraisal Guidance (TAG) UNIT A4.1 Social Impact Appraisal
- DMRB Volume 11, Section 2, Part 5 , National Highways (Withdrawn)
- DMRB LA104: Environmental assessment and Monitoring Rev 1, National Highways




A3

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**Key**

**Highway Link**

**Link Reference** 00

**Etihad Stadium**

Coordinate System: EPSG:3857

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| Rev | Date | By | Chkd | Appd | Authd |
|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- |

ARUP

10, The Plaza,
100 Old Hall St
Liverpool L3 9QJ
Tel +44 151 227 9397

Client

**Manchester City Football Club**

Project Name

**Etihad North Stand Expansion**

Drawing Title

**Figure 13.1: Link Reference Plan**

Scale at A3
**NTS**

Role
**--**

Suitability
**--**

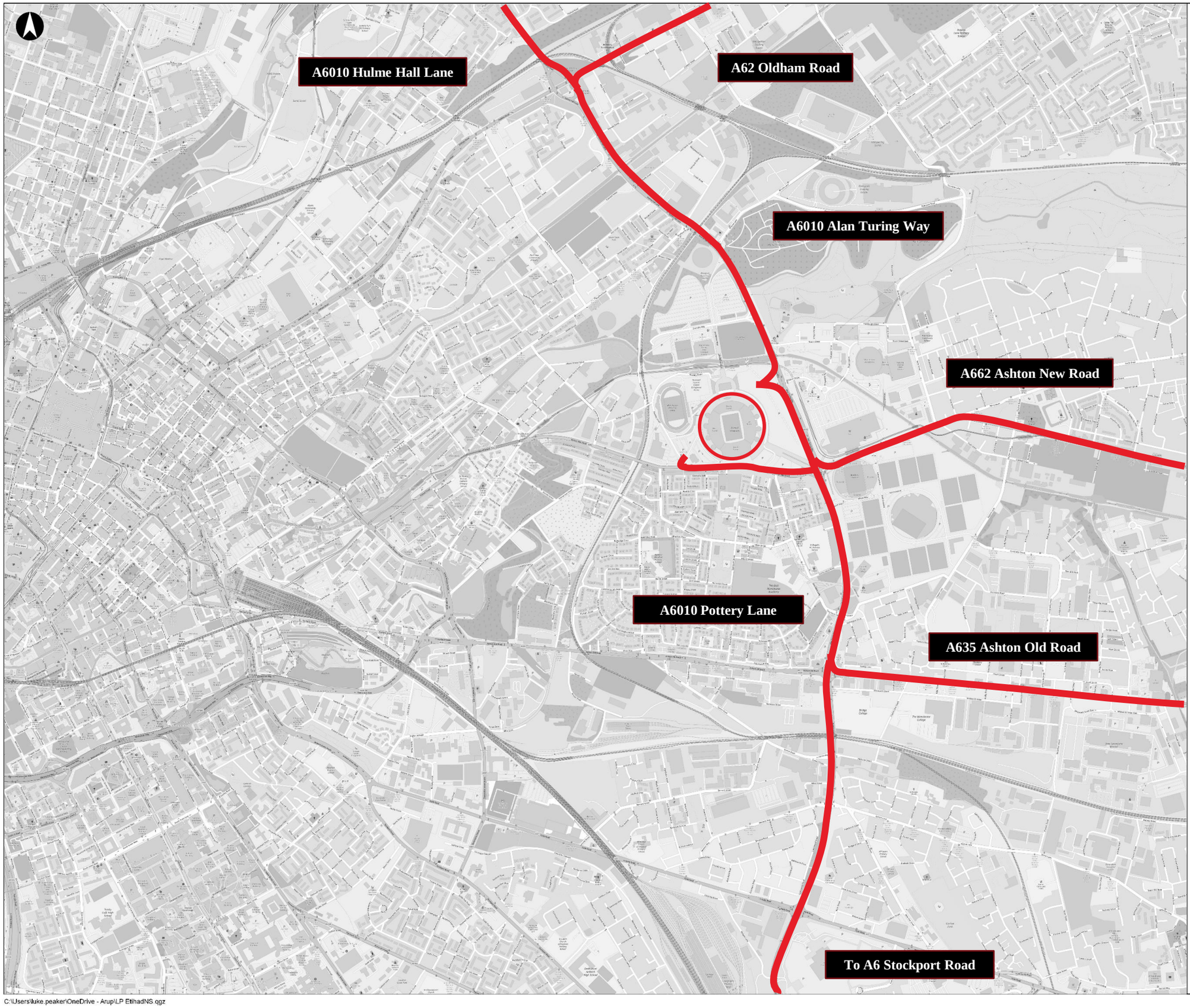
Project Number
**293414-00**

Rev
**A**

Drawing Name
**EtihadNS_13.1**

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A3

02/02/2023 08:47 AM

**Key**

**HGV Construction Traffic Route**

**Etihad Stadium**

Coordinate System: EPSG:3857

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| Rev | Date | By | Chkd | Appd | Authd |
|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- |

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10, The Plaza,
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Client

**Manchester City Football Club**

Project Name

**Etihad North Stand Expansion**

Drawing Title

**Figure 13.2: HGV Construction Traffic Routes**

Scale at A3
**NTS**

Role
**--**

Suitability
**--**

Project Number
**293414-00**

Rev
**A**

Drawing Name
**EtihadNS_13.2**

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# 14. Wind Microclimate

## Introduction

14.1. This Chapter of the ES has been prepared by Buro Happold and assesses the likely Wind Microclimate impacts of the proposals upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

| Technical Competence in Wind Microclimate and EIA | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Lydia Denton | Bernardo Vazquez |
| Company | Buro Happold | Buro Happold |
| Qualifications/Accreditations relevant to technical area | BSc | PhD MSc BSc<br><br>Board Member and Vice-Chair of Wind Engineering Society UK |
| Does the practitioner hold any IEMA qualification? | No | No |
| Company hold IEMA QMark? | No | No |
| Years technical experience (in technical area) | 3 | 25 |
| Number of EIA's delivered to date | 2 | 20 to 30 |

## Limitations and Assumptions

14.2. Future surrounding buildings are based on information available and current planning permissions, and the available information from previous assessments. At the time of writing no future surroundings were identified close enough to be considered, within the area where the wind assessment was carried out (i.e. within a 450 radius of the Site), so no cumulative assessment has been carried out. If this changes in the future, the effects would have to be reviewed within a cumulative scenario.

### CFD Modelling Assumptions

14.3. Computational Fluid Dynamics (CFD) modelling involves the solution of the fundamental equations of fluid motion using numerical techniques. The area of interest is divided into numerous small volumes, or cells, and the equations are solved within each cell. Values of the variables that are solved in the model are determined in each cell and so a comprehensive assessment of pressure and velocity variation within

the calculation domain is obtained. To improve the resolution of the results, the 'mesh' or collection of cells is refined in the areas of most interest. This ensures that the large gradients of pressure and velocity at every location within the domain are modelled accurately.

#### Model Extents and Detail

14.5. The geometry of the baseline and the Proposed Development was taken from a 3D model provided by the design team (Figure 14.1). Buildings close to the Site, which are likely to affect and be influenced by the presence of the Proposed Development, were modelled.

14.6. To account for the presence of buildings and terrain features, an aerodynamic roughness of 0.8 metres (m) was applied to the surface of neighbouring areas, which is typical for city centres.

#### Atmospheric Boundary layer

14.7. The upwind and downwind boundaries of the model are representative of the atmosphere surrounding the Site.

14.8. For each of the 12 wind directions, a single, steady-state URANS (Reynolds Average Navier Stoke) calculation was made using the commercial ANSYS CFX software. Turbulence was modelled using a 'SST model', with a production limiter used to ensure realistic flow predictions close to stagnation points. This method allows for the assessment of mean wind speeds of the Proposed Development. The effect of gusts and time dependent flow phenomena were considered qualitatively in this study.

## Legislative and Policy Context

### National Planning Policy

14.9. There are no national codes of practice or legislative policies relating to the assessment of environmental wind flows in the built environment. The effect of environmental wind on pedestrian spaces and the subsequent suitability of these spaces for planned usage are described by Lawson Comfort Criteria (LCC) (Ref 1), which are recognised by Local Planning Authorities (LPAs) as a suitable benchmark for wind assessments. LCC is applied in the wind assessment of the Proposed Development.

14.10. There is no specific national or regional legislation or policy guidance for the assessment of the local wind microclimate effect that a new development has on the comfort and safety of users.

### Local Planning Policy

14.11. A number of local authorities provide planning guidance for tall buildings, recommending that a wind microclimate assessment be performed. Manchester City Council's (MCC) adopted Core Strategy (July 2012) contains guidance in its Policy EN2, advice on tall buildings; for buildings considered to be significantly higher than their neighbours. Policy EN 2 states that a tall building can have a significant effect on the local environment and microclimate. Policy EN 2 concludes that it is expected this effect should be modelled and that the application of tall buildings should include measures to create an attractive pedestrian friendly local environment.

## Assessment Methodology and Significance Criteria

### Impact Assessment Methodology

#### Construction

14.12. A quantified assessment of the impacts of the Proposed Development during construction has not been included in this ES Chapter. This is because wind effects at pedestrian level are closely associated with the size and shape of the massing of buildings and during the construction stage this condition will be continuously changing. Therefore, during the construction stage, the effects will be both varying and temporary. However, using professional experience, a qualitative assessment has been undertaken and is included in the Identification and Evaluation of Significant Effects section.

14.13. Cranes will be used on-site during construction; however, it can be noted that these are typically slender and relatively "open" structures. They would therefore not be expected to introduce any material microclimate effects to the Site or surrounding area that would require assessment in this ES.

### Operational Development

14.14. The wind study includes a direct comparison between the baseline conditions and those created by the Proposed Development for 12 wind directions. The Chapter describes the quantitative assessment of the likely wind environment, and the qualitative judgements that are made in order to identify areas of potential concern. This analysis included an assessment of the relative forms, layouts and massing of the existing Site and the Proposed Development, as well as landscaping and topography.

14.15. Impacts of the likely wind conditions are judged based on the CFD modelling results and Buro Happold's extensive experience of wind assessments, full-scale testing, CFD and wind tunnel modelling of similar developments.

14.16. CFD simulations were used to quantify the local wind speeds within and in the vicinity of the Site at various street locations (e.g. pedestrian access routes, building entrances, outdoor seating areas) for a comprehensive range of wind directions. CFD, as a tool for pedestrian wind modelling, is well validated against wind tunnel tests and real-world data and is often considered advantageous due to its advanced visualisation and domain wide measurement capabilities. Also, CFD is performed at full scale with wind speeds calculated at tens of millions of discrete points, allowing for a large amount of data to be used for the assessment of the wind microclimate conditions. Like any other tool, it has its own limitations; however, good quality CFD is increasingly becoming an accepted tool in modern standards and guidance documents.

14.17. The results presented within this ES Chapter make use of the wind statistics obtained from the meteorological station at Manchester Airport, corrected for the Site (accounting for upwind terrain and reference height at the Site), to determine the probability of local wind speeds exceeding comfort and safety thresholds for a range of common pedestrian activities.

14.18. The assessment is supported by CFD modelling of the full range of wind speeds and directions for the two configurations (which have been suggested to the Local Planning Authority through the EIA Scoping Process), as follows:

- Configuration 1: Existing Site (baseline); and
- Configuration 2: Proposed Development with existing surroundings.

14.19. Configurations 1 and 2 were run without any landscape in place. Existing and proposed hard and soft landscaping will be incorporated as indicated by the landscape strategy, this is likely to be beneficial to the local environment surrounding the Proposed Development.

### Assessment Criteria

14.20. The criteria used in this study were based on the LDDC (London Docklands Development Corporation) version of the Lawson Criteria (henceforth referred to as 'LDDC Lawson Criteria') See Table 14.1. Like most criteria used in assessments of pedestrian wind conditions, they relate to a threshold wind speed and a threshold frequency to the suitability of an activity.

14.21. Wind microclimate comfort strongly depends on an individual's activity; therefore, has been defined separately for each activity in terms of an average (mean) wind speed exceeded for a certain percentage of the year.

14.22. The pedestrian comfort criteria have been developed around the Beaufort scale (Lawson 2001), extending its applicability to environments in and around buildings.

14.23. The assessment has been undertaken to investigate the likely pedestrian conditions in and around the Proposed Development when it is subject to wind from different directions. An assessment of the appropriateness of different parts of the Site for their intended use has also been made.

14.24. A comfort map was created to illustrate the assessment results. This map includes a direct correlation between the calculated wind speeds by the CFD simulations and the wind frequency data near the Site for the last 10 years. It provides a complete picture of the likely wind conditions related to certain activities, indicating when suitable conditions can be achieved for carrying out such activities or if distress is likely to be experienced. The maps cover the whole Site on a plane 1.5 m above ground level, where wind speeds are measured.

14.25. The criterion is based on measured wind conditions to be above a threshold wind speed set at no more than 5% of the time. Given activities are then set for these velocity thresholds as Sitting, Standing, Pedestrian walking/Strolling and Pedestrian walking through. There is a fifth category when conditions are likely to uncomfortable.

14.26. If conditions for a certain area are above those set for the activity for these areas, mitigation is likely to be required.

14.27. The Lawson criteria (LDDC) is used to assess the wind speeds for different activities. The criteria that has been used to assess the unacceptable threshold for different activities as well as the distress criteria is listed in Table 14.1.

14.28. The frequency threshold for each criterion is 5% - or about two and a half weeks per year. It is also useful to assess frequency on a seasonal basis. For example, an outdoor seating area may require wind conditions suitable for sitting or standing in summer, but not in winter when the seating is unlikely to be used due to other factors, e.g. ambient temperature and precipitation. For season-specific results, the criteria are based on 5% of hours across the months in that season.

Table 14.1 – LDDC Lawson 2001 Comfort Criteria thresholds for levels of wind speed

| Comfort Scales | | |
|---|---|---|
| Wind Speed Category | Wind Speed – not to be exceeded more than 5% of time (m/s) | Tolerable Activity |
| | 0-4 | Sitting |
| | 4-6 | Standing |
| | 6-8 | Pedestrian walking |
| | 8-10 | Pedestrian walk through |
| | >10 | Uncomfortable |

14.29. Additionally, criteria for safety have been defined based on 0.022% exceedance (~1.9 hours) per year. These are areas where someone could find walking difficult or even lose their footing. The criterion is reproduced in Table 14.-2 below.

Table 14.2 – Threshold for wind safety exceedance

| Safety rating | Threshold mean-hourly wind speed exceeded once per annum (0.025%) | Description |
|---|---|---|
| **S15 - Unsuitable for the general public** | >15 m/s | Presents a safety risk for pedestrians, especially to more vulnerable members of the public. |
| **S20 - Unsuitable for able-bodied** | >20 m/s | Presents a safety risk for all pedestrians. |

## Methodology for Defining Effects

### Significance Criteria

14.30. The magnitude of impact of existing/off-site receptors has been categorised using professional judgement based on the change in velocity observed from the baseline.

14.31. A significant effect for the purposes of the EIA Regulations in this assessment is considered to be an effect of major significance, which would involve breaches of the distress criteria described in Table 14.1 above. These types of effects will require detailed and careful mitigation. Alternatively, a major beneficial effect would be identified where the Proposed Development resulted in the removal of a safety issue from the baseline condition.

14.32. Moderate and minor effects are not considered to be significant effects; however, where adverse effects are identified, in order to reduce the effects further and improve the comfort of receptors, mitigation measures to reduce the effects from moderate adverse to minor adverse will be specified as appropriate.

Table 14.2 Significance Criteria

| Effect significance | Description | Mitigation Required? |
|---|---|---|
| Major | Any impact that affects safety (or distress). | Yes |
| Moderate | Any impact affecting pedestrian comfort where conditions change from suitable for existing activities to unsuitable for proposed activities is considered to be moderate and vice versa for positive impacts. | No |
| Minor | Conditions that are marginal with respect to the criteria or criteria are met during key seasons only. | No |
| Negligible | Represents the cases of minimal or no effect on wind conditions that is likely to be experienced. | No |

14.33. Effects can be:

- Adverse – detrimental or negative effects to an environmental resource or receptor compared with the baseline condition; or
- Beneficial – advantageous or positive effect to an environmental resource or receptor compared with the baseline condition.

### Sensitive Receptors

14.34. The following sensitive receptors have been identified and assessed:

- All pedestrian circulation routes, building entrances, waiting areas (e.g. bus stops and pick-up/drop off points) leisure open areas and outdoor seating spaces within the Proposed Development.

### Categorising Likely Significant Effects

14.35. For on-site receptors, any major adverse effect is a 'significant effect' because it implies that a location, or area, has a wind microclimate that is unsuitable in terms of pedestrian safety and/or comfort for the desired use of that area. On this basis, effects that are major adverse need mitigating.

14.36. For off-site receptors, a major adverse effect is a 'significant effect' because it implies that a location, or area, which was previously suitable in terms of pedestrian comfort and/or safety, has become unsuitable for the desired use of that area. On this basis, only off-site effects that are major adverse need mitigating.

14.37. Beneficial effects that are moderate or major in scale are considered to be 'significant' or a material consideration for planning, as they result in an improvement in the local wind environment.

## Baseline Conditions

14.38. A quantitative assessment of the likely wind environment has been performed and judgements made to identify areas of potential concern. A CFD study was carried out to support the wind assessment; this provides an indication of the wind effects on-site.

14.39. Knowledge of the existing use of various parts of the Site and neighbouring buildings and open spaces was based on a site visit undertaken to assess the likely pedestrian activity. For the Proposed Development, the design team provided information regarding the intended usage of different parts of the Site. This included streets and paths proposed for pedestrian walkways and areas where outdoor amenity space will be located.

### Wind Conditions

14.40. The prevailing wind across Manchester is from the south and south-west, with some lesser contributions from all other directions. During the winter there are some contributions from the north-east. Good quality long-term weather data is available from MET data for Manchester Airport. This is the most appropriate data for use within this assessment and has been used for other applications in Manchester city centre.

14.41. Wind speeds are generally highest in the winter and spring with the seasonal pattern showing a very similar range of directions for winter, spring and autumn. Summer has southerly and westerly prevailing winds with the largest speeds from the south.

14.42. The data was translated to meteorological standard terrain (open country) and then to the Site. The method used was the method set out in The Designer's guide to wind loading of building structures, Part 1 (1985), N.J.Cook . This allows for the sheltering effect of neighbouring terrain but does not allow for the channelling of wind, for instance due to rivers and valleys. This effect is not expected to dominate conditions here.

14.43. The predicted site wind rose is shown in Figure 14.3. This shows the direction the wind is blowing from, with long bars representing frequent winds and colour representing magnitude of wind speeds. The seasonal wind roses plots are shown in Figure 14.4. South and south-westerly winds are the prevailing direction for all four seasons. The largest wind speeds occur during the winter.

## Site exposure – Configuration 1

### Comfort assessment

Concourse and Terrain

14.44. In the baseline condition, the Site is largely exposed particularly to the east and south. Surrounding buildings include the Co-op live arena approximately 30m height (currently under construction) to the north and the Manchester regional arena approximately 10m height to the west.

14.45. Comfort maps indicating the predicted pedestrian wind conditions are shown in Figures 14.5 and 14.6 for the baseline summer and winter conditions (worst season/near extreme scenario) respectively and located on the concourse and surrounding terrain only 1.5m above ground height. The comfort map combines the calculated wind speeds from the CFD simulations and the wind frequency data for the last 10 years. The map provides an overall picture of the wind conditions relating to certain pedestrian activities, indicating when acceptable conditions are achieved for the proposed activities.

14.46. Analysis of wind speeds on Site at the concourse and terrain suggest that pedestrian level conditions in the exposed areas (concourse and terrain) are suitable for “pedestrian sitting” and “standing” for much of the year (see Figure 14.5). During the worst season to the south of the Site, conditions show it is suitable for “strolling” whilst a small area approximately 2m in diameter at the southeast corner of the south stand exhibits conditions suitable for “walking/fast walking” (see Figure 14.6). this is likely due to the cumulative effect of prevailing winds to the south and southwest and the exposed area (apart from small residential buildings to the south). The rest of the surrounding areas show calm conditions suitable for "sitting” and “standing”.

14.47. Current site activities are assumed to be “pedestrian walking” and “pedestrian strolling”. Apart from entrances which are assumed to be “pedestrian standing”. Conditions are expected to be suitable for these activities in both the summer and the worst-case scenario; however, pedestrians may feel discomfort at the southeast corner as this close to the entrance of the south stand (which show conditions suitable for walking not standing) in winter.

### Safety assessment

14.48. There are no safety exceedances for the baseline configuration for the concourse and terrain (see Figure 14.7).

### Comfort assessment

Seating

14.49. Analysis of wind speeds at the seating and field of play indicate “pedestrian sitting” conditions for both the summer and worst season (see Figures 14.8 and 14.9). This is suitable for the assumed activities of “pedestrian sitting” in the seating and “pedestrian walking” in the field of play.

### Safety assessment

14.50. There are no safety exceedances for the baseline configuration for the seating (see Figure 14.10).

## Future baseline

14.51. Although climate change is currently expected to have significant effects at a national level, wind conditions are not likely to change sufficiently to require specific analysis. No clear pattern of increasing

strength or frequency of strong winds has thus far been identified. As such it is normal practice to assume that historical wind conditions give a good indication of the likely range of future conditions.

14.52. The general pattern of increased development in the city is likely to lead to a general increase in shelter and modest reduction in wind speeds in the area. This means that the future baseline is the same as the current condition unless development on the Site or adjacent to the Proposed Development takes place.

## Identification and Evaluation of Significant Effects

### Construction

14.53. It is possible that as the buildings start rising from the ground, this will cause temporary localised wind acceleration across the Site. Since the effects are short-term and local, and the normal sheltering from standard site hoardings is expected to be sufficient; therefore, negligible effects are expected.

14.54. During construction, localised wind acceleration is likely to result in a gradual transition to the new conditions. Impacts from this will be negated at ground level through the provision of hoardings (causing negligible effects).

### Operation – Configuration 2

#### Comfort assessment

Concourse and Terrain

14.55. The massing of the Proposed Development can be seen in Figure 14.1. The Proposed Development comprises new buildings that will incorporate commercial and mixed-used facilities together with areas of public realm.

14.56. The predicted wind conditions created, as a result of the operational scenario have been assessed and are illustrated in Figures 14.11 and 14.12. These results present the predicted wind conditions of the Proposed Development for the summer and the winter (worst season), based on the LDDC criteria as listed in Table 14.1 above. Safety is also assessed and shown in Figure 14.13.

14.57. The Proposed Development was tested with the existing landscape in place; this is a conservative (worst case) scenario.

14.58. Analysis of wind speeds on Site at the concourse and terrain suggest that pedestrian level conditions in the exposed areas are suitable for “pedestrian sitting” and “standing” for much of the year (see Figure 14.11), apart from the southeast corner of the stadium over an approximate 2m radius, which is suitable for “strolling”. Compared to the baseline case there is an increase in wind speeds to the north of the Proposed Development and a reduction to the northwest. These changes are negligible as both results are appropriate for the intended activity.

14.59. During the worst season overall, the Site shows an increase in wind speeds when compared to the baseline; nevertheless this is negligible (see Figure 14.12). However, the southeast corner of the stadium shows an increase in wind speeds, where an approximate 6m radius area is suitable for “pedestrian walking/fast walking” which results in a minor adverse effect. The increase in wind speeds is likely due to the increased massing associated with the Proposed Development and thus the amount façade downwash and funnelling around the Site. The rest of the surrounding areas show calmer conditions suitable for "sitting”, “standing” and “strolling” to the south of the stadium.

14.60. Current site activities are assumed to be “pedestrian walking” and “pedestrian strolling” apart from entrances which are assumed to be “pedestrian standing”. Conditions are expected to be suitable for these activities in both the summer and worst-case scenario; however, pedestrians may feel discomfort at the southeast corner as this close to the entrance of the south stand (which show conditions suitable for walking not standing in winter).

### Safety assessment

14.61. The analysis of the annual safety conditions (see Figure 14.13) highlighted a safety issue at the southeast corner of the stadium very close to the south façade where comfort conditions are suitable for "fast walking". Wind for the Proposed Development configuration at this same location (a smaller area of around 2x2m) is predicted to exceed 15 m/s for 2.0 hours per year, against the target threshold of 1.9 hrs, and so the exceedance is very marginal. The existing baseline conditions already identify an area of acceleration for "walking" that in some cases can be linked to safety issues, i.e. may be just below the 1.9 threshold. This 2.0 hrs per year is a marginal exceedance within a very small area that has been already identified as "fast walking" conditions. Therefore, a conclusion has been reached within the parameters of this assessment that mitigation is not required, based on an understanding of the likelihood of the exceedance corresponding with when there are likely to be people in this area.

### Comfort assessment

Seating

14.62. Analysis of wind speeds at the seating and field of play indicate "pedestrian sitting" conditions for both the summer and worst season (see Figures 14.14 and 14.15). This is suitable for the assumed activities of "pedestrian sitting" in the seating and "pedestrian walking" in the field of play.

### Safety assessment

14.63. There are no safety exceedances for the baseline configuration for the seating (See Figure 14.16).

### Comfort assessment

Terraces

14.64. Analysis of wind speeds at the terraces show "pedestrian sitting" conditions for the summer with a small area to the south suitable for "standing" (see Figure 14.17). For the worst season (see Figure 14.18) conditions show mainly "pedestrian sitting" with some areas of "standing" slightly increased from the summer season on the northeast and southeast terraces. Both conditions are suitable for the intended activities of the space and therefore the increase in wind speeds are negligible.

### Safety assessment

14.65. There are no safety exceedances for the baseline configuration for the terraces (see Figure 14.19).

## Landscaping

14.66. This analysis of both cases was carried out with the inclusion of the existing landscape at the south perimeter of the stadium. Figure 14.2 shows the proposed landscaping. It is likely that the addition of the landscaping will help to improve comfort conditions. The assessment shows that the conditions are suitable for sitting in the summer at different locations, this is likely to improve further once the final landscaping has been incorporated within the public realm.

## 2014 Extant Consent

14.67. An assessment of the 2014 consented scheme was scoped out of the wind microclimate assessment at the EIA scoping stage. An assessment of this scenario is not considered relevant as the change to the stadium design with the new north stand proposals means wind effects and associated mitigation cannot directly be compared.

## Mitigation Measures

### Construction

14.68. There are no significant construction effects anticipated, therefore no mitigation is required. However standard construction mitigation measures will be implemented including standard site hoardings to shelter neighbouring areas.

### Operation

14.69. No mitigation is required during operation of the proposed development.

## Cumulative Effects

14.70. No future development was identified within the area of assessment (i.e. 450m radius from the Site); therefore cumulative effects are negligible.

## Residual Effects

### Construction

14.71. There are no significant residual construction effects, therefore no mitigation is required. However, standard construction mitigation measures will be implemented including standard site hoardings to shelter neighbouring areas.

### Operation

14.72. The residual effects during operation of the Proposed Development can be seen in Table 14.4.

14.73. The results show that there is a small area (approximately $2m^2$) where the safety criteria is predicted to exceed 15 m/s for 2.0 hours per year, against the target threshold of 1.9 hrs, therefore the exceedance is very marginal. Therefore, a conclusion has been reached within the parameters of this assessment that mitigation is not required, based on an understanding of the likelihood of the exceedance corresponding with when there are likely to be people in this area. See section 14.1.

Table 14.4 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| | Negligible | None required | Negligible |
| **Operational** | | | |
| Pedestrians walking around the south area of the stadium | Minor adverse | Small marginal safety area<br>None required | Minor adverse |
| Pedestrians walking around the hotel underpass and proposed buildings | Negligible | None required | Negligible |

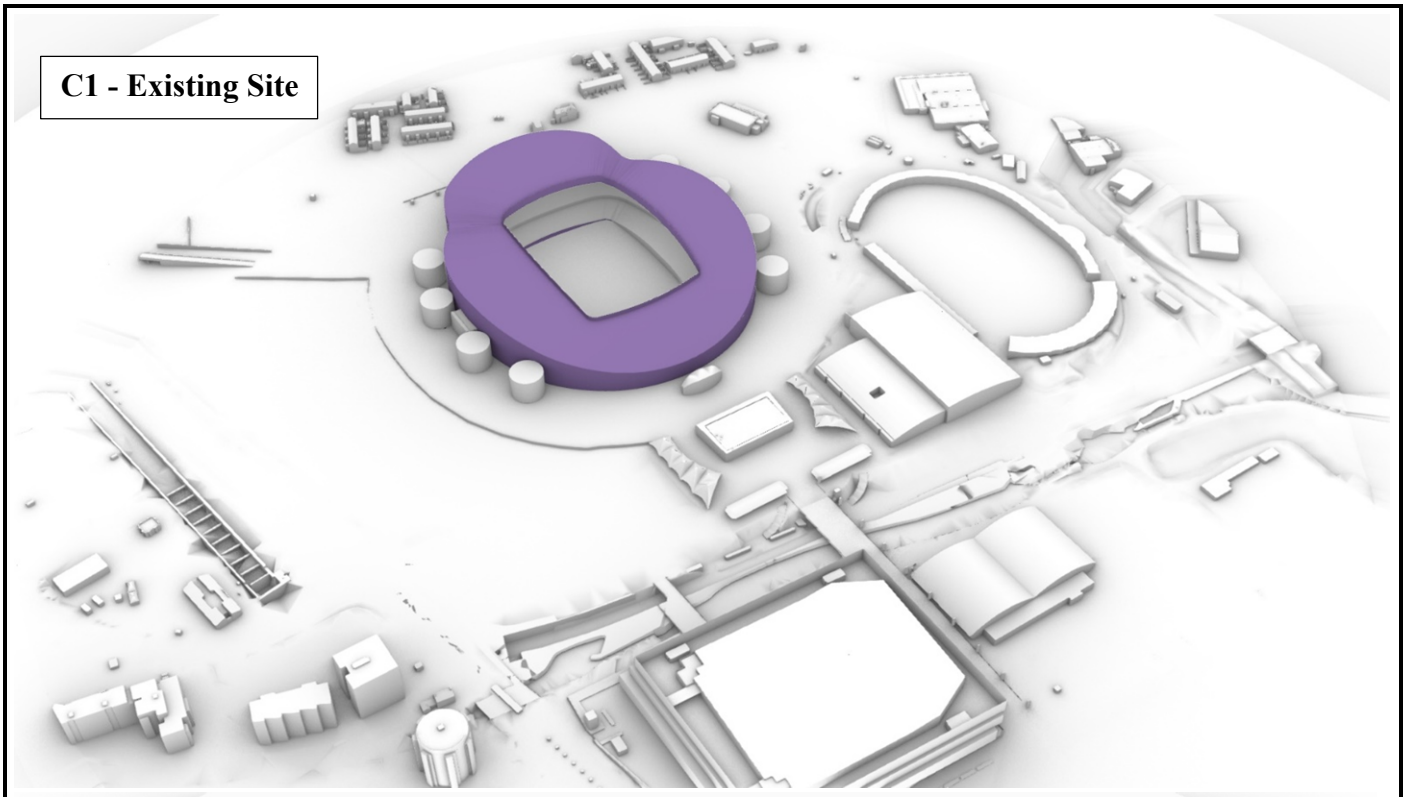
| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Pedestrians walking around the area underneath the canopy | Negligible | None required | Negligible |
| Pedestrians walking at the north concourse ground areas | Negligible | None required | Negligible |
| Pedestrians walking at the east concourse areas | Negligible | None required | Negligible |
| Pedestrians walking at the west concourse areas | Negligible | None required | Negligible |
| Pedestrians using the terraces | Negligible | None required | Negligible |

## Reference List

14.74. This ES Chapter has been prepared by reference to the following:


- Lawson, T. (2001). Building Aerodynamics. Imperial College Press.
- Ansys. (2021, September 21). Ansys Products. Retrieved from Ansys: https://ansys.com/en-gb/products/fluids/ansys-cfx
- UK CLIMATE PROJECTIONS – UKCP09 Probabilistic projections of wind speeds July 2020

C1 - Existing Site



C2 - Proposed Development



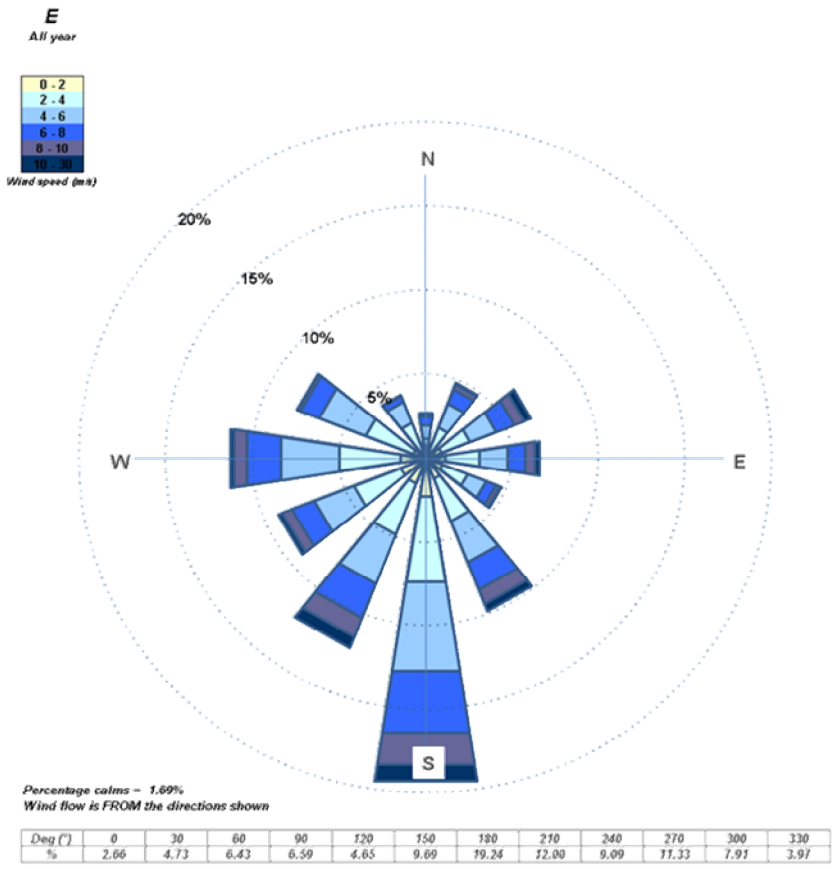
| | | | | |
|---|---|---|---|---|
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| | Title: | Existing Site and Proposed Development massing | | |
| | Project: | North Stand, Manchester | | |
| | Date: | March 2023 | Scale: | Scale /NTS |




**KEY**

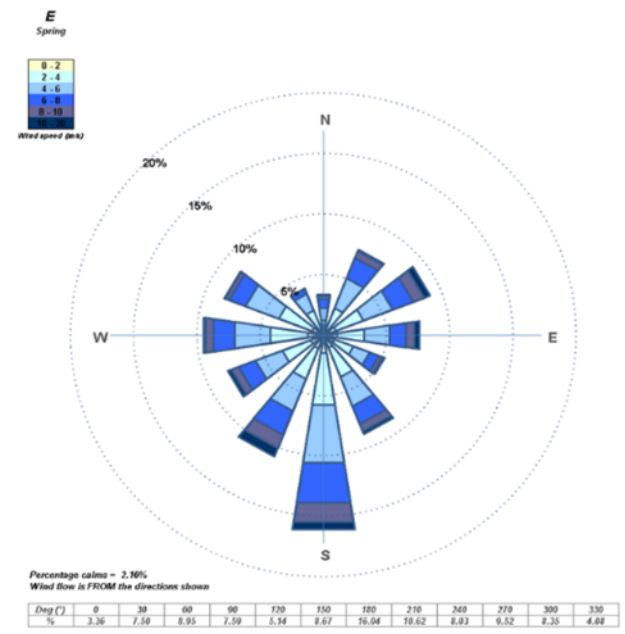
- PROJECT BOUNDARY
- NATURAL STONE PAVING - TYPE 1 BLACK GRANITE (BOUND)
- NATURAL STONE PAVING - TYPE 2 MID GREY GRANITE (BOUND)
- PERMEABLE CONCRETE BLOCK PAVING - TYPE 1 (BOUND) LIGHT GREY
- NON-PERMEABLE CONCRETE BLOCK PAVING - TYPE 2 (BOUND) MID GREY
- POROUS BLACK TARMAC
- BLACK TARMAC
- UNDERSTORY PLANTING
- ARTIFICIAL TURF
- SUDS PLANTER
- WILDFLOWER AREA
- GRAVEL
- QUEUEING ZONE
- HOTEL SIGNAGE
- LITTER BIN
- PEDESTRIAN ACCESS GATE WITH CARD READER
- VEHICLE ACCESS GATE
- ROAD MARKING
- PICNIC TABLE
- FLOORBOX (POWER, DATA, WATER)
- PROPOSED TREE
- REMOVABLE BENCH
- RAISED PLANTER
- TREE GRILLE
- TREE CELL WITH ROOT BARRIER
- LIGHT COLUMN
- RETRACTABLE BOLLARD (PAS 68 RATED)
- STATIC BOLLARD (PAS 68 RATED)
- 316 STAINLESS STEEL DEMARCATION STUD
- CONCRETE FLUSH KERB
- CONCRETE RAISED KERB
- BUILDING THRESHOLD DRAINAGE
- CHANNEL DRAIN
- PEDESTRIAN ROUTE
- GREEN SCREEN
- TANK ENCLOSURE WALL
- SECURITY FENCE
- DRAINAGE GULLY
- BALUSTRADE

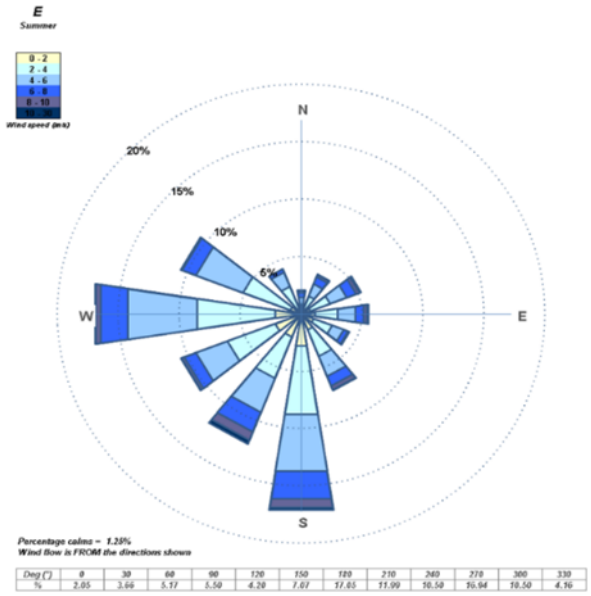
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| | **Figure:** | **14.2** | | |
| | **Title:** | **Proposed landscaping plan** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |

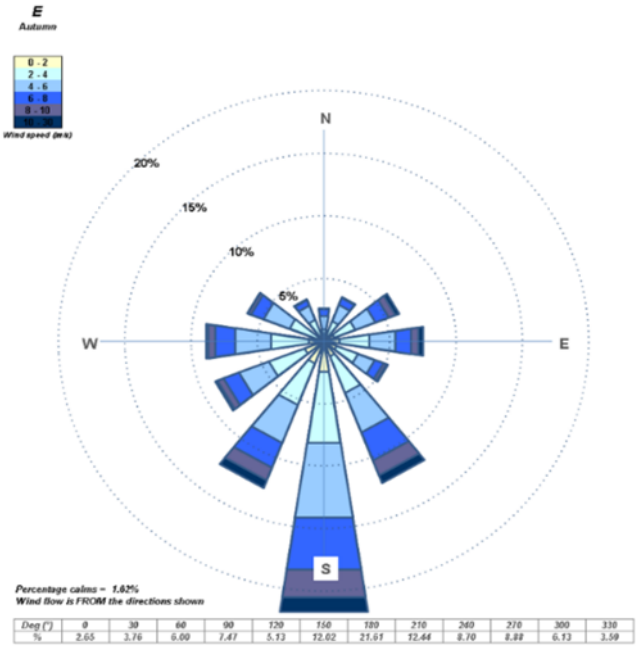


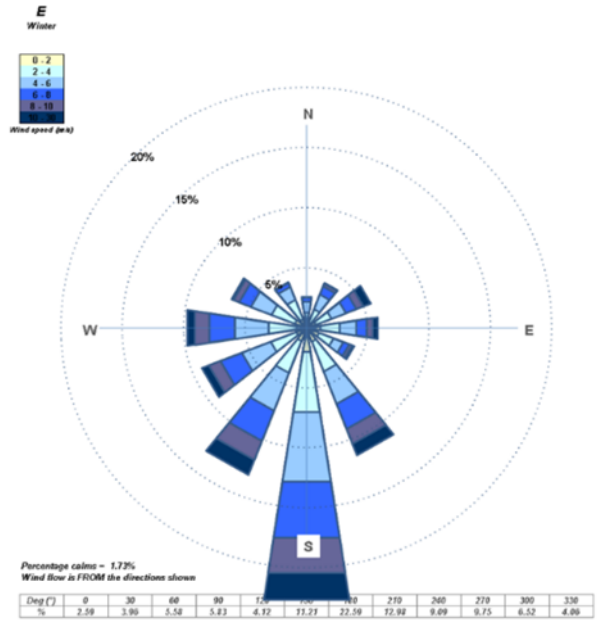

| Deg (°) | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 2.66 | 4.73 | 6.43 | 6.59 | 4.65 | 9.69 | 19.24 | 12.00 | 9.09 | 11.33 | 7.91 | 3.91 |

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.3** | | |
| | **Title:** | **Site wind rose** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |

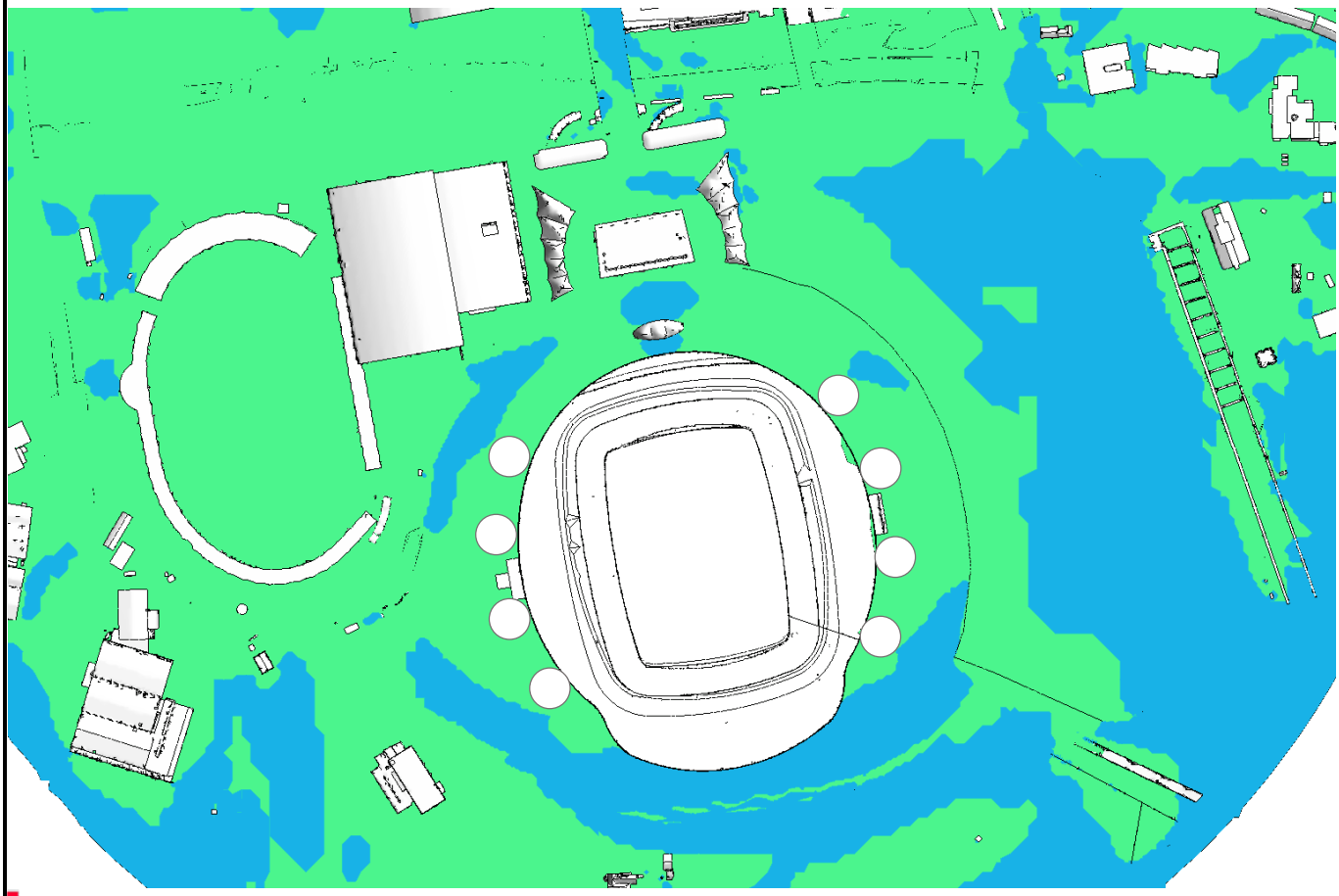



| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.4** | | |
| | **Title:** | **Seasonal wind roses** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |



Uncomfortable

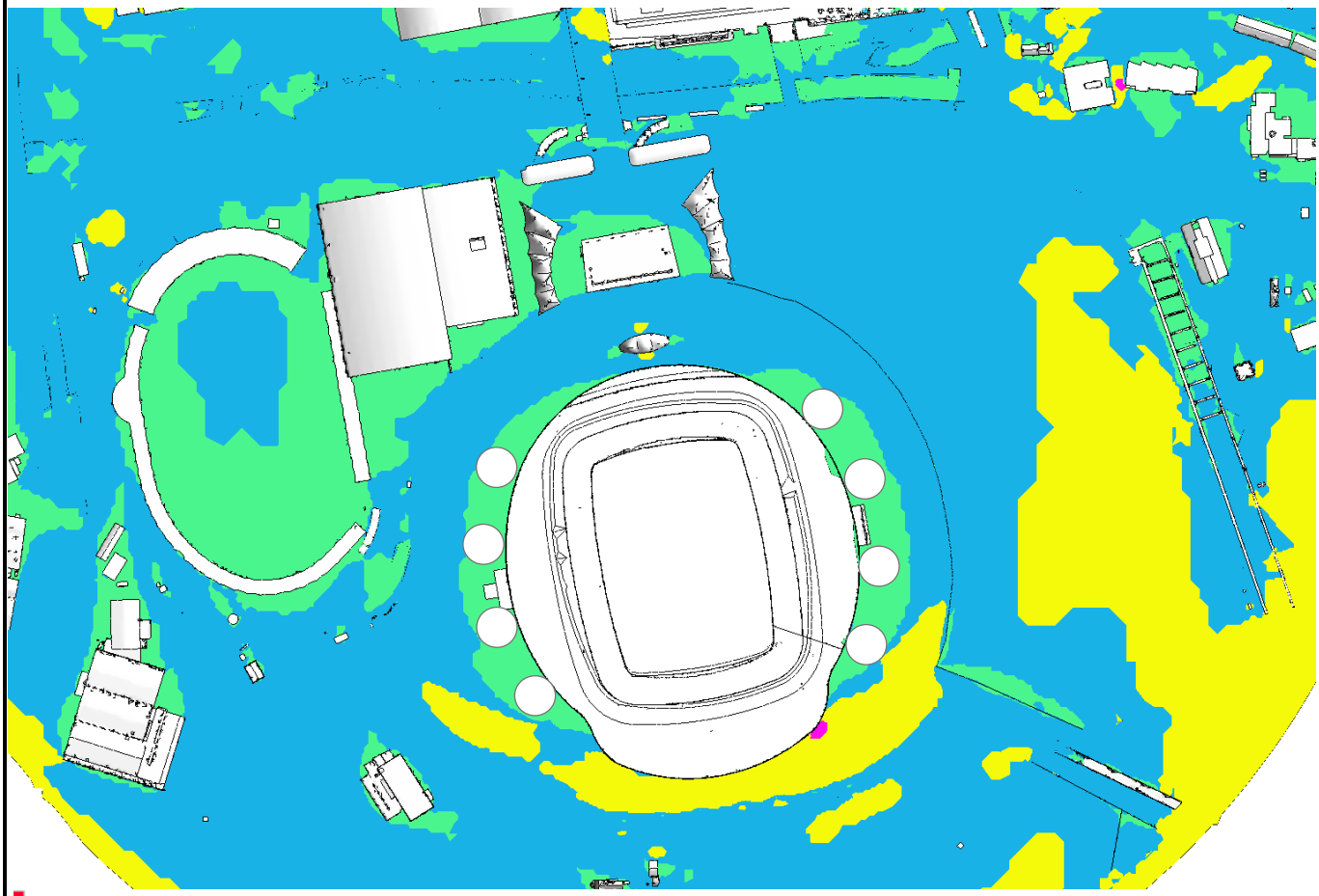
Walking

Strolling

Standing

Sitting

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.5** | | |
| | **Title:** | **Baseline: Comfort map summer. Concourse and Terrain** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |



Uncomfortable

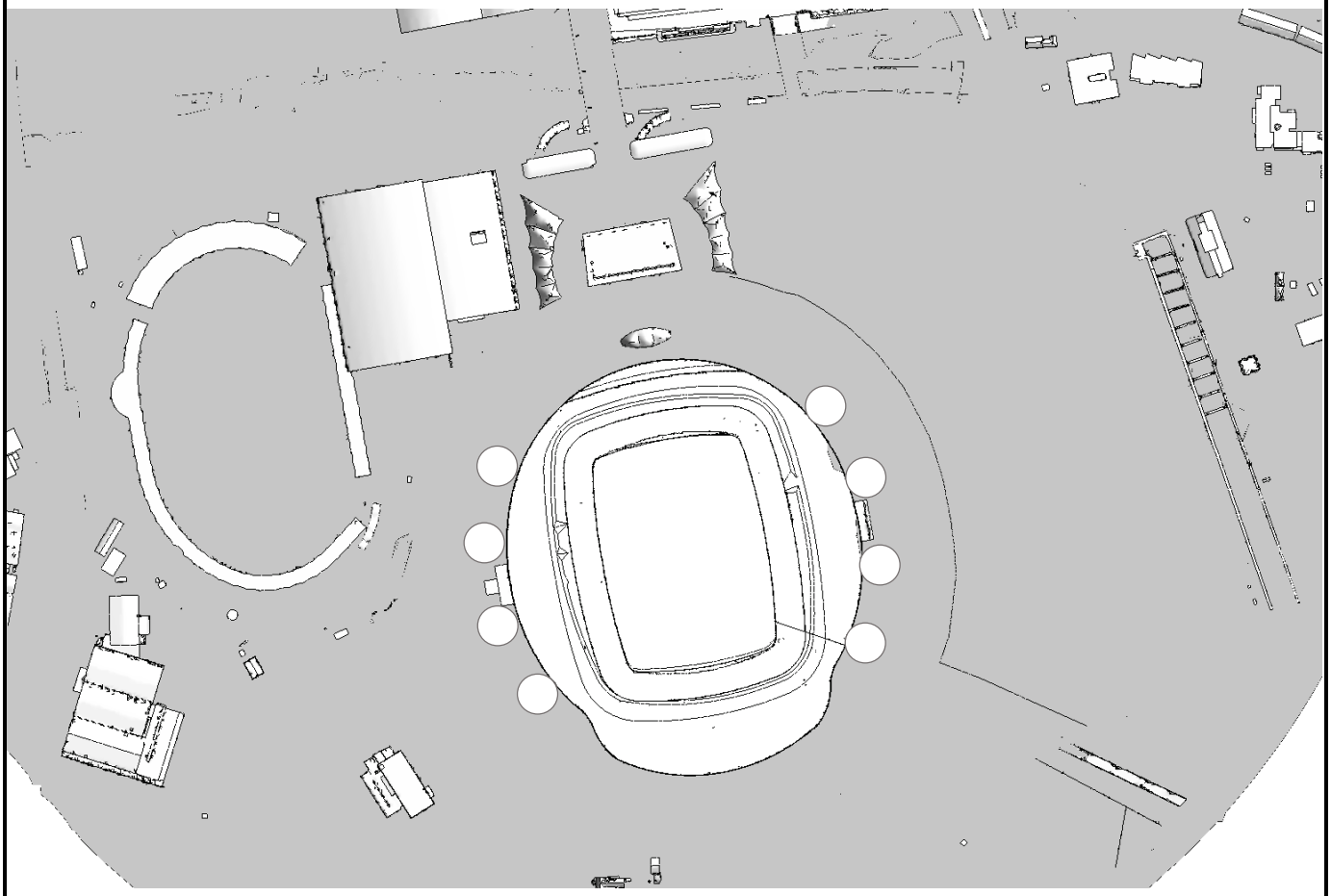
Walking

Strolling

Standing

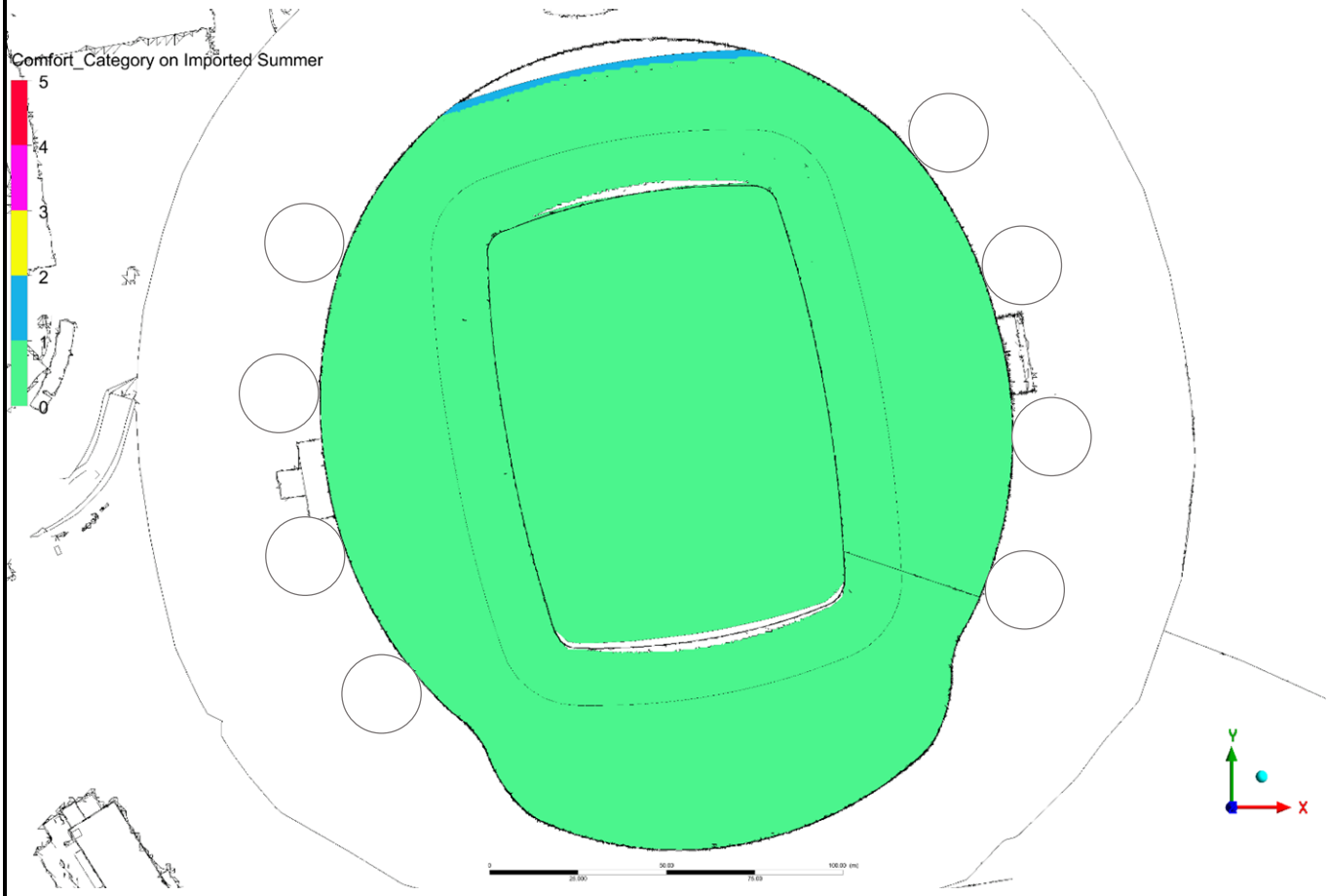
Sitting

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.6** | | |
| | **Title:** | **Baseline: Comfort map winter. Concourse and Terrain** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |



- Above 20m/s – Able-bodied people
- Above 15m/s – Cyclist and Frail people
- Under 15m/s - Safe

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.7** | | |
| | **Title:** | **Baseline: Safety map annual. Concourse and Terrain** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Uncomfortable

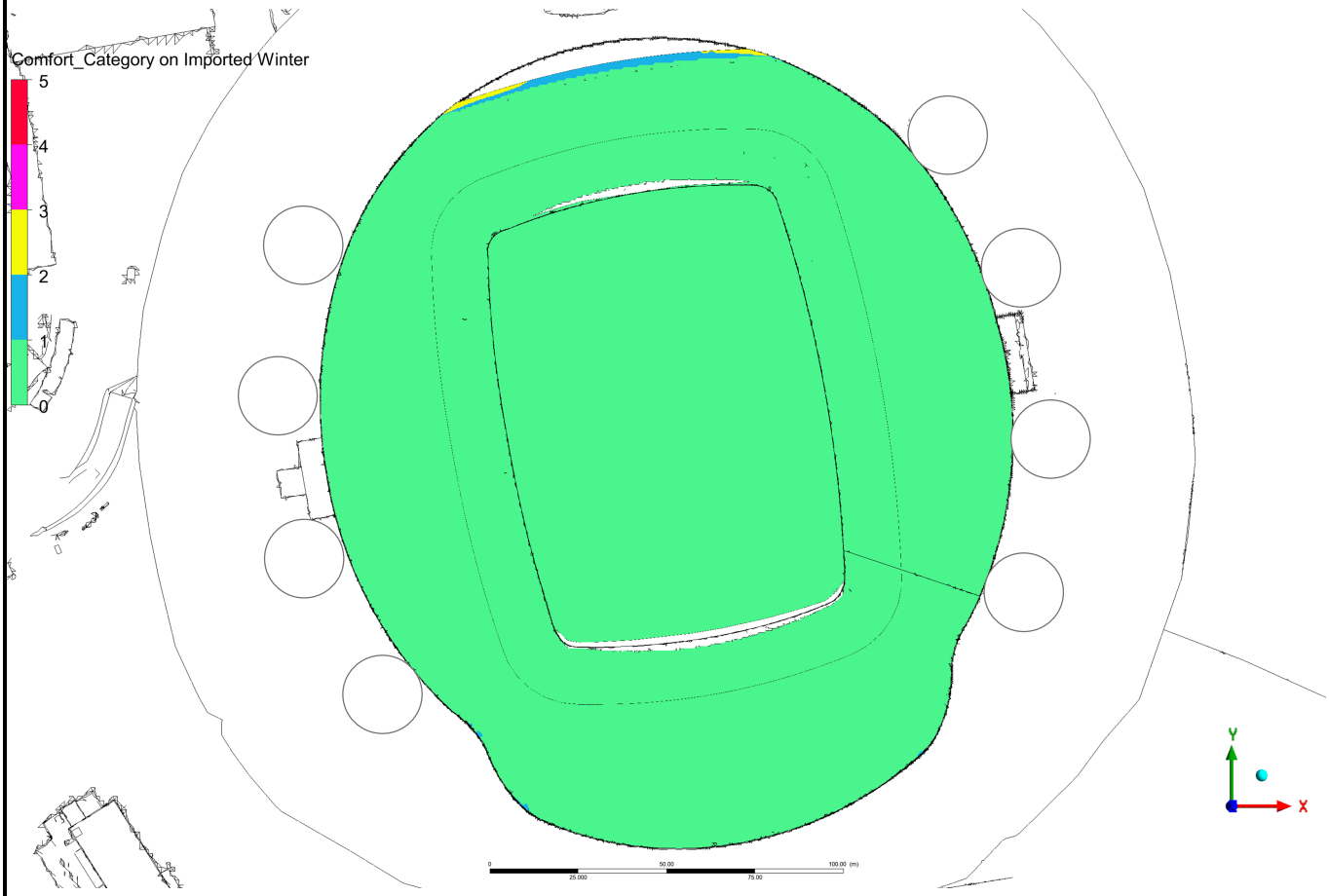
Walking

Strolling

Standing

Sitting

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|---|---|---|---|---|
| | **Figure:** | **14.8** | | |
| | **Title:** | **Baseline: Comfort map summer. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Uncomfortable

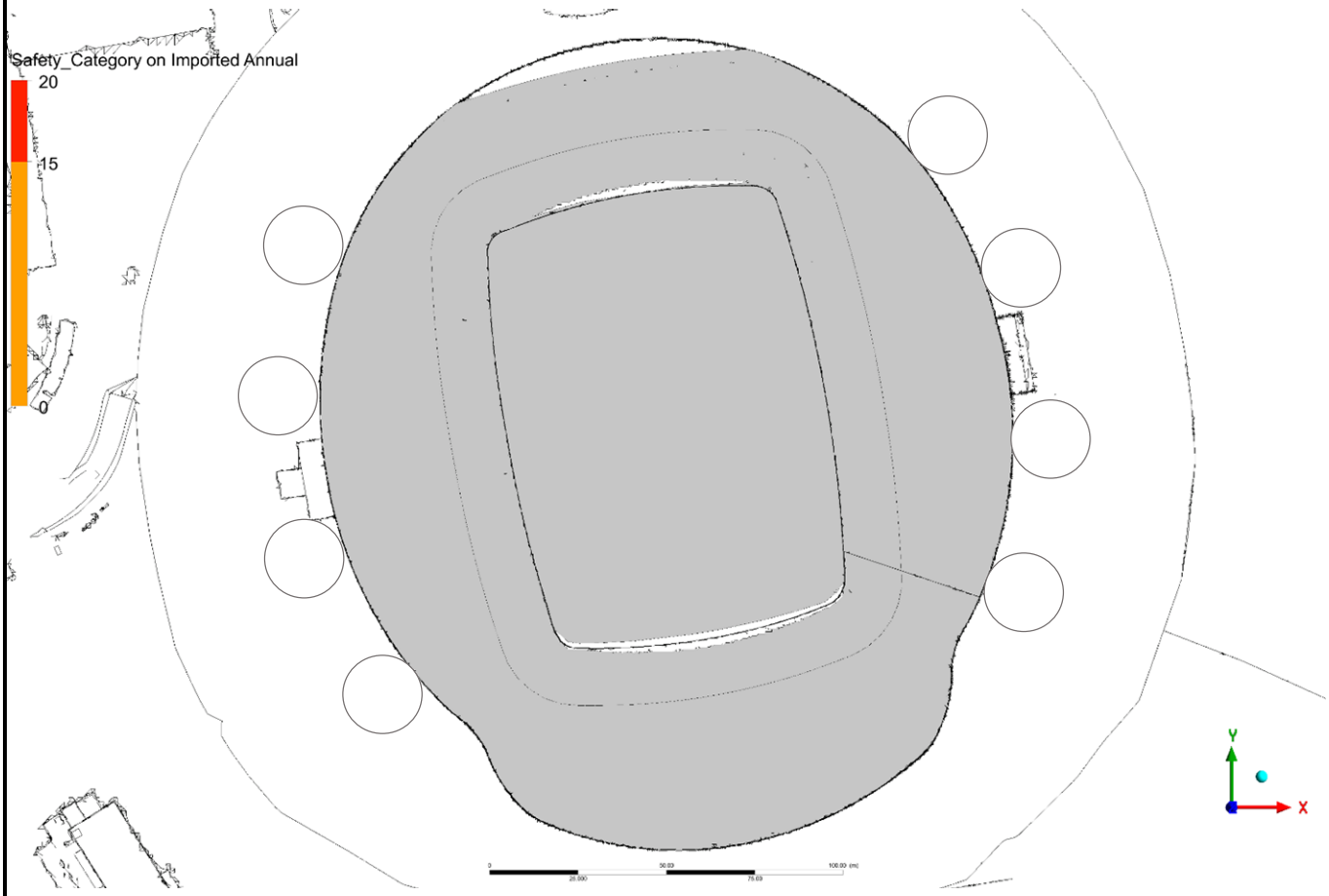
Walking

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Standing

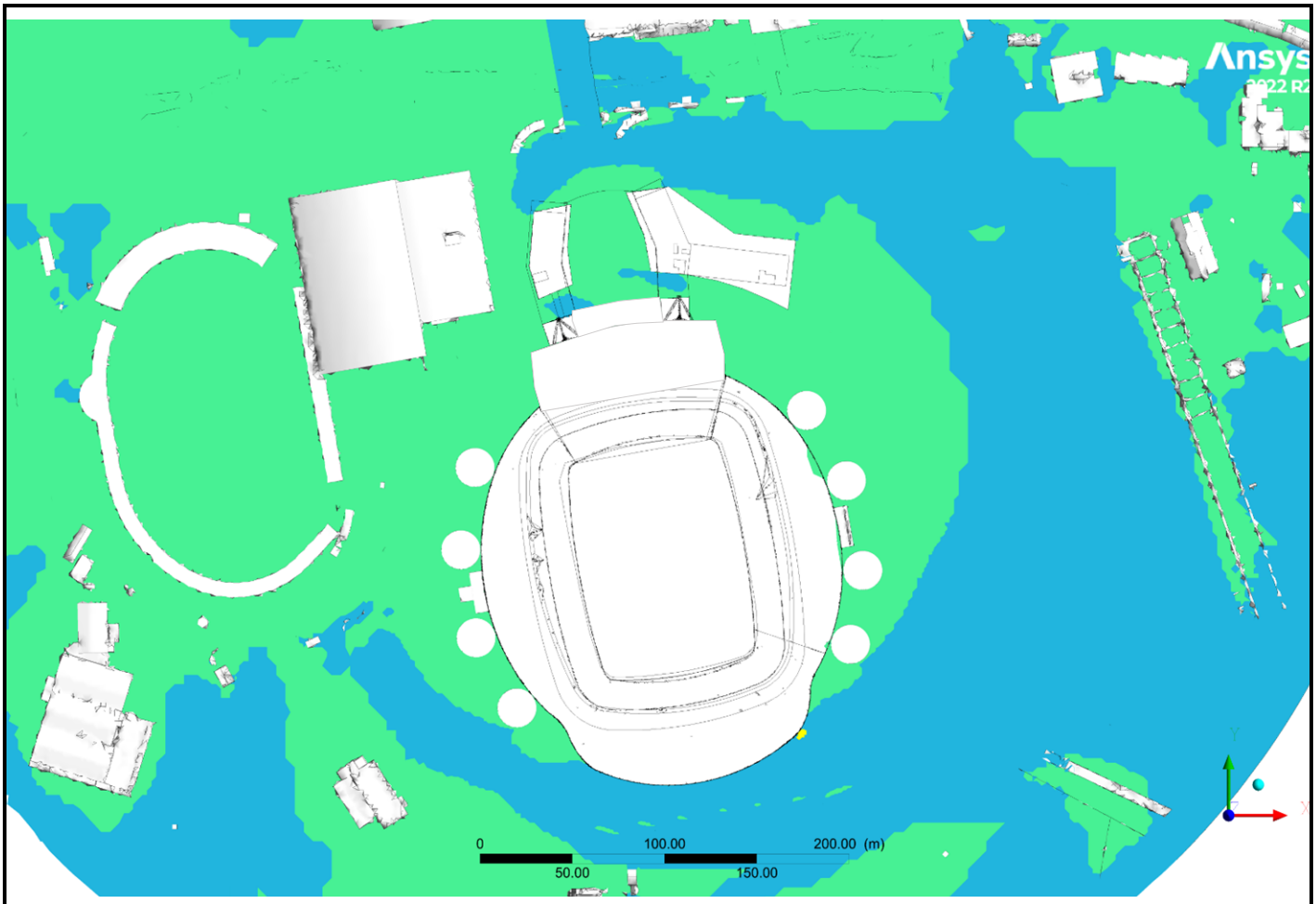
Sitting

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|---|---|---|---|---|
| | **Figure:** | **14.9** | | |
| | **Title:** | **Baseline: Comfort map winter. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




- Above 20m/s – Able-bodied people
- Above 15m/s – Cyclist and Frail people
- Under 15m/s - Safe

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| | **Figure:** | **14.10** | | |
| | **Title:** | **Baseline: Safety map annual. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Uncomfortable

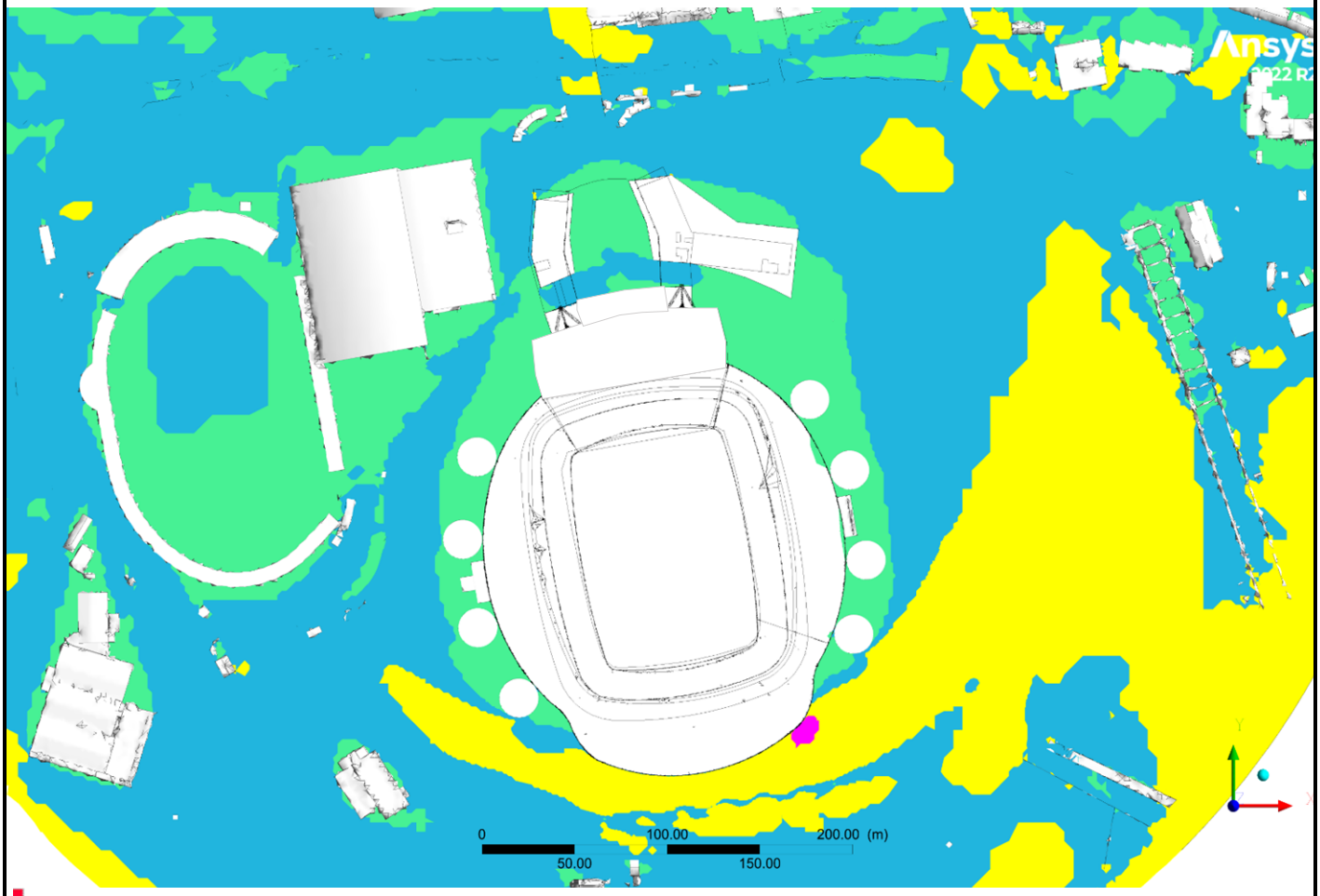
Walking

Strolling

Standing

Sitting

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|---|---|---|---|---|
| | **Figure:** | **14.11** | | |
| | **Title:** | **Proposed: Comfort map Summer. Concourse and Terrain.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Uncomfortable

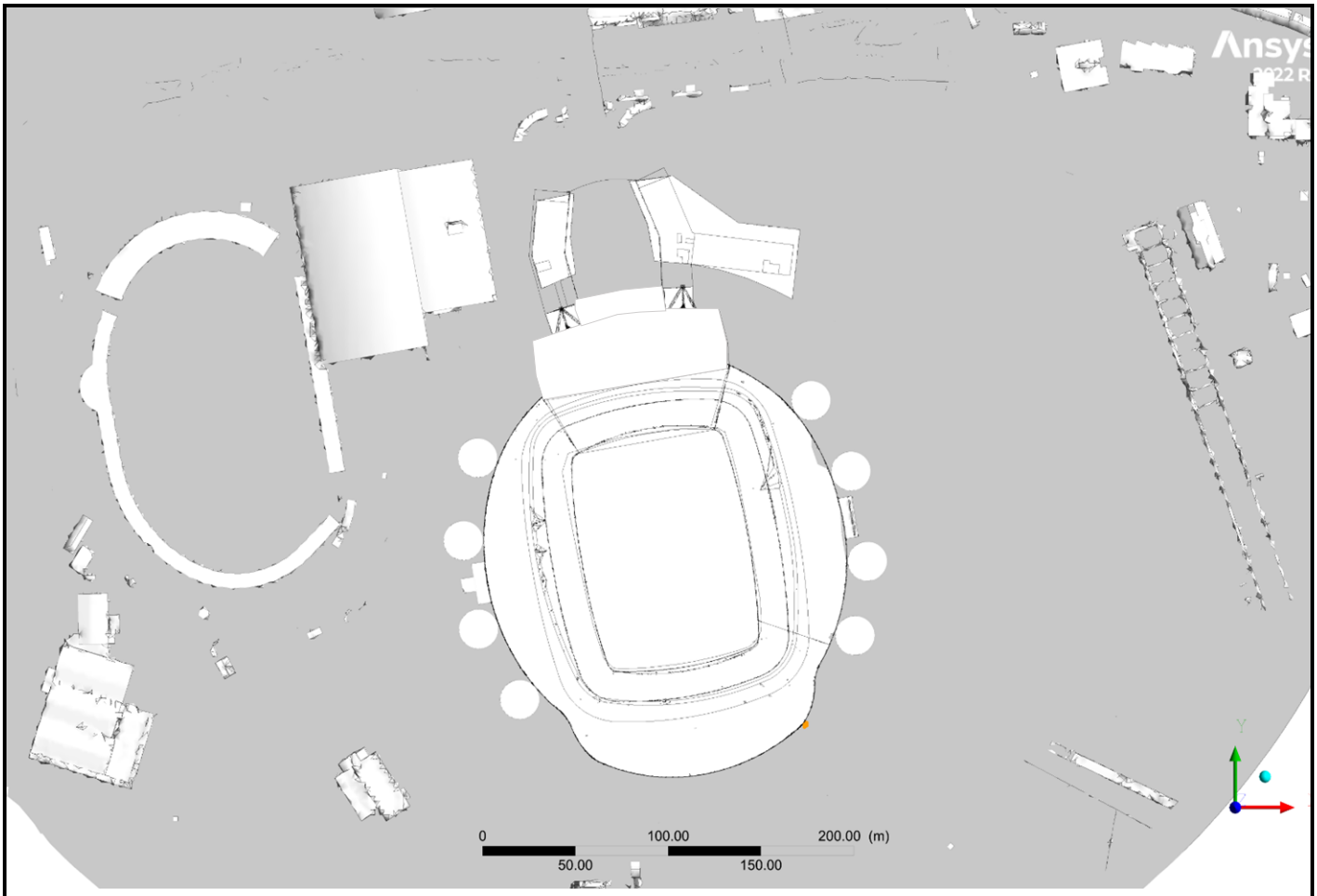
Walking

Strolling

Standing

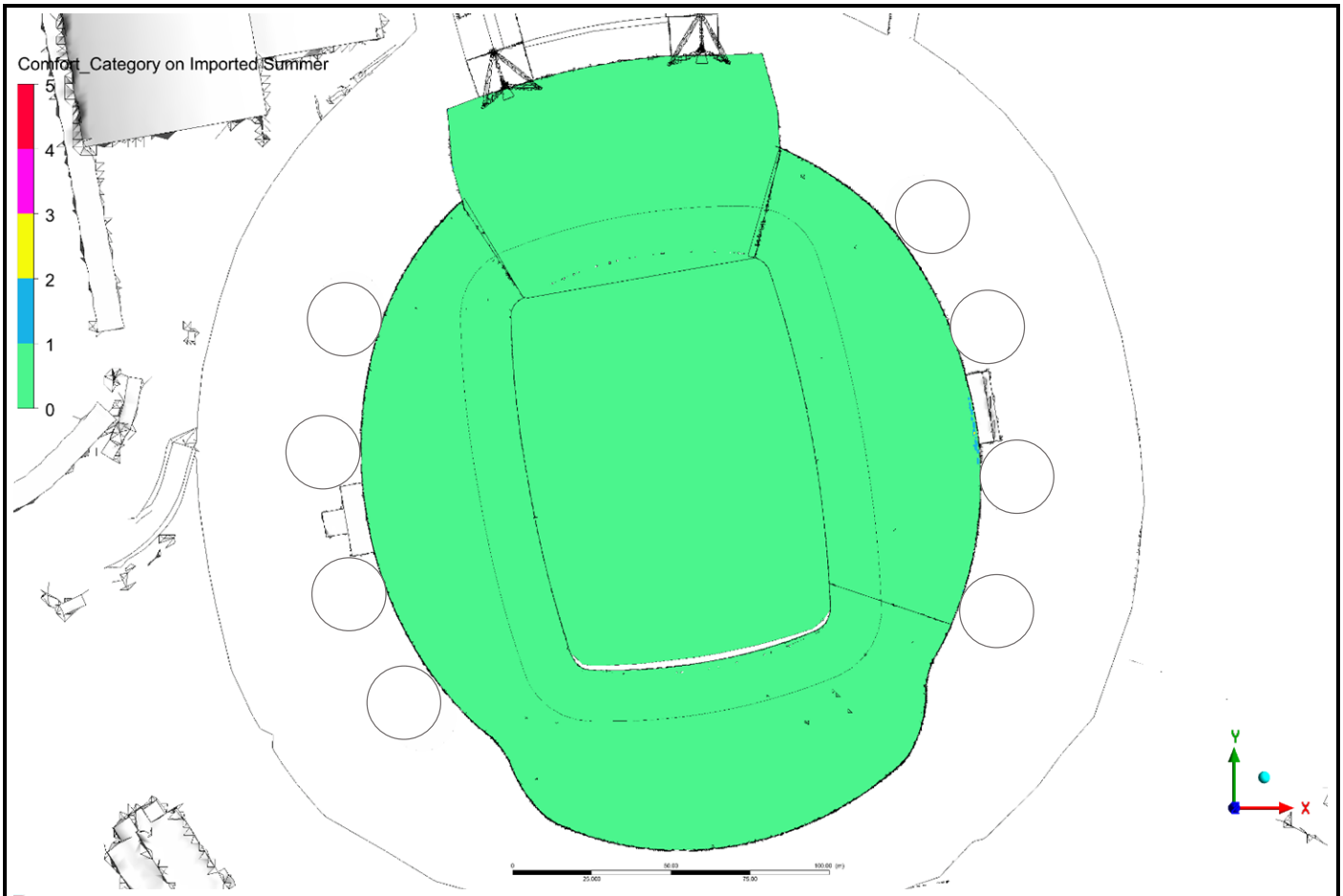
Sitting

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| | **Figure:** | **14.12** | | |
| | **Title:** | **Proposed: Comfort map Winter. Concourse and Terrain.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




- Above 20m/s – Able-bodied people
- Above 15m/s – Cyclist and Frail people
- Under 15m/s - Safe

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|---|---|---|---|---|
| | **Figure:** | **14.13** | | |
| | **Title:** | **Proposed: Safety map Annual. Concourse and Terrain.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




**Uncomfortable**

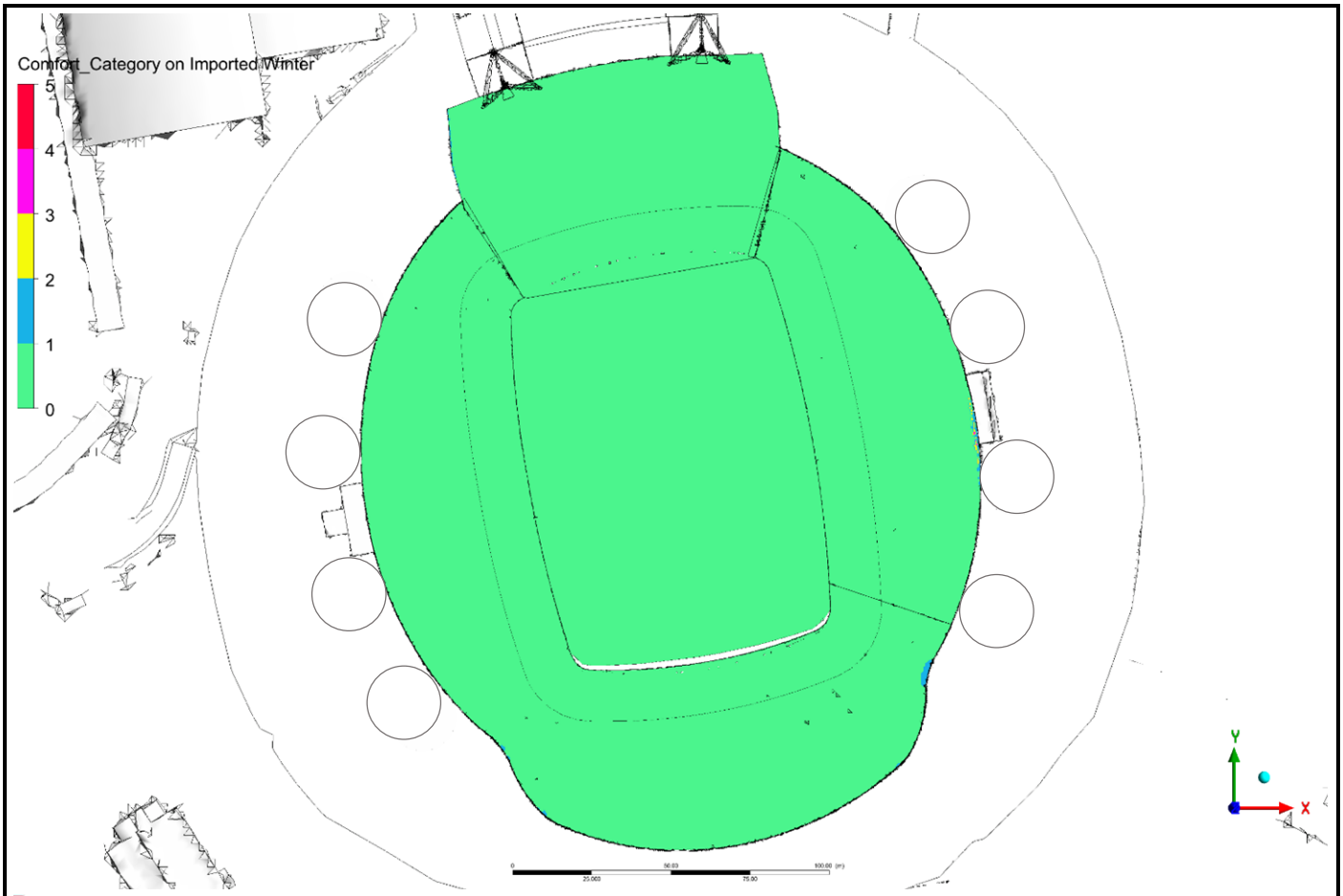
**Walking**

**Strolling**

**Standing**

**Sitting**

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| | **Figure:** | **14.14** | | |
| | **Title:** | **Proposed: Comfort map Summer. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




**Uncomfortable**

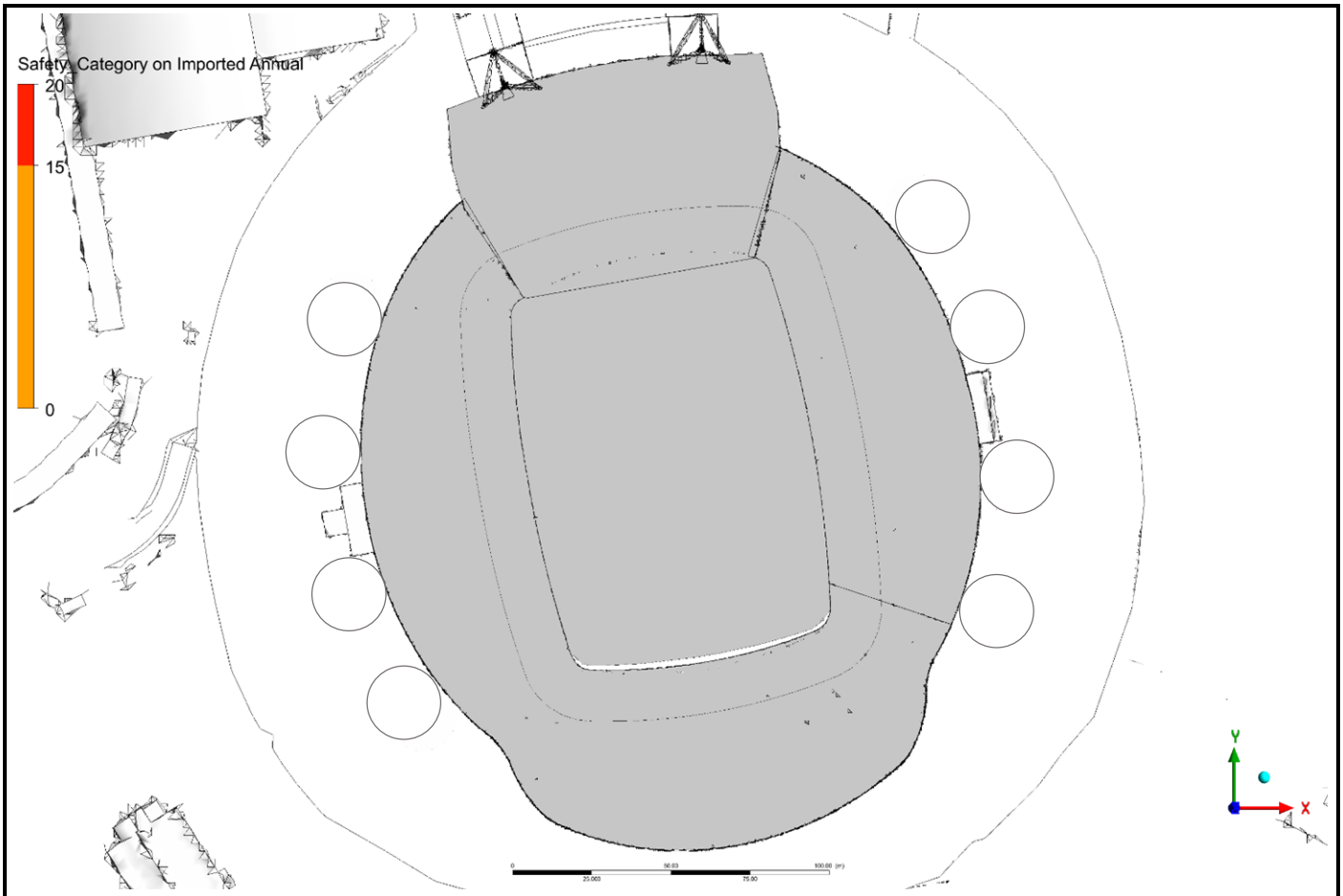
**Walking**

**Strolling**

**Standing**

**Sitting**

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|---|---|---|---|---|
| | **Figure:** | **14.15** | | |
| | **Title:** | **Proposed: Comfort map Winter. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Above 20m/s – Able-bodied people

Above 15m/s – Cyclist and Frail people

Under 15m/s - Safe

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.16** | | |
| | **Title:** | **Proposed: Safety map Annual. Seating and field of play.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




**Uncomfortable**

**Walking**

**Strolling**

**Standing**

**Sitting**

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.17** | | |
| | **Title:** | **Proposed: Comfort map summer. Terraces.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




**Uncomfortable**

**Walking**

**Strolling**

**Standing**

**Sitting**

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.18** | | |
| | **Title:** | **Proposed: Comfort map Winter. Terraces.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |




Above 20m/s – Able-bodied people

Above 15m/s – Cyclist and Frail people

Under 15m/s - Safe

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **14.19** | | |
| | **Title:** | **Proposed: Safety map Annual. Terraces.** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **March 2023** | **Scale:** | **Scale /NTS** |

# 15. External Lighting

## Introduction

15.1. This Chapter of the ES has been prepared by ME Engineers and assesses the likely lighting impacts of the proposals upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted. This document assesses the light pollution effects as a result of both the construction phase and completed Proposed Development. The chapter is accompanied by the following appendices:

- Appendix 15.1: Existing Lighting Condition Survey and Assessment

15.2. The principal authors for this chapter are Xavier Fulbright BArchEng, Technical Director and Head of Lighting for ME Engineers, and Philip White CIBSE, Technical Director of ME Engineers. Xavier is a lighting engineer with over 23-years of experience, a contributor to CIBSE Technical Manuals and has authored Light Pollution EIA chapters for several recent major developments. Xavier is a member of the Institute of Lighting Professionals.

| | Lead Author | Reviewer |
|---|---|---|
| Name | Xavier Fulbright | Phil White |
| Company | ME Engineers | ME Engineers |
| Qualifications/Accreditations relevant to technical area | Bachelor of Architectural Engineering – Electrical/Lighting | BEng (Hons) Building Services Engineering |
| Does the practitioner hold any IEMA qualification? | No | No |
| Company hold IEMA QMark? | No | |
| Years technical experience (in technical area) | 23 | 25 |
| Number of EIA's delivered to date | 10 | 2 |

## Development Proposals

15.3. The proposed external lighting treatments for the site is presented in Figure 15.1.

15.4. This Chapter of the ES accompanies an application for Full Planning Permission for the 'North Stand Project' at the Etihad Campus comprising of interrelated components ("the Proposed development"). Please see the Planning Statement and Application Form for the formal Description of Development.

15.5. Further information about the Proposed Development can be found within the Design and Access Statement prepared by Populous, the Planning Statement, and the Application Form prepared by Deloitte and submitted in support of the application.

## External Lighting Proposals

15.6. The external lighting design for the Proposed Development will abide by all relevant legislation and planning policy guidance as described in this report. The external lighting will be comprised of the following treatment proposals:

- Functional public realm illumination to all hardscape areas and City Square;
- Landscape lighting to pedestrian zones and key softscape areas;
- Facade illumination highlights and illumination of the City Square roof structure;
- 3nr LED media screens (2nr facing north towards Joe Mercer Way and the Etihad Campus station, 1nr facing east towards Alan Turing Way).

## Limitations and Assumptions

15.7. The baseline conditions described in Appendix 15.1 have been established during a site visit on the 24th of January 2023. Thus, they are specific to the lighting conditions that were current on that day.

15.8. The assessment has been undertaken based on the assumption that the final external lighting design will include technical/environmental performance characteristics and lighting selections that adhere to the performance characteristics described within the Legislative and Policy Context section in this report.

15.9. For the purpose of this report, it is assumed that the lighting conditions at the Site will remain the same if the Proposed Development is not built.

## Legislative and Policy Context

15.10. This section sets out the relevant lighting policy, legislation and good practice guidance.

### Legislation

15.11. Environmental Protection Act 1990 defines the light statutory nuisance from artificial lighting and includes guidance on suggested controls for local authorities for exterior lighting dependant on context

### National Planning Policy

15.12. Paragraph 180 of the National Planning Policy Framework (NPPF) 2018 states: “Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: (excerpt C) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

15.13. The Planning Practice Guidance (PPG) (3) makes the following references to light pollution:

- Paragraph 001 (Reference ID 31-001-20140306) states, “Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential to a new development. Equally, artificial light is not always necessary, has the potential to become what is termed ‘light pollution’ or ‘obtrusive light’ and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife, undermine enjoyment of the countryside or detract from enjoyment of the night sky. For maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time.”
- Paragraph 002 (Reference ID 31-001-20140306) states, “Some proposals for new development, but not all, may have implications for light pollution” and “Local planning authorities and applicants should think about: where light shines; when the light shines; how much light shines; and, possible ecological impact.”
- Paragraph 003 (Reference ID 31-001-20140306) suggests light spill “can usually be completely avoided with careful lamp design selection and positions: lighting near or above the horizontal is usually to be

avoided to reduce glare and sky glow (the brightening of the night sky), and good design, correct installation and ongoing maintenance are essential to the effectiveness of lighting schemes."

- Paragraph 004 (Reference ID: 31-003-20140306) of the PPG considers the use of lighting only when required in order to minimize light pollution and reduce harm to wildlife, improving people's ability to enjoy the night sky. The PPG suggests that lighting schemes could be turned off when not needed ('part-night lighting') or reduced between the hours of midnight and sunrise. It also recommends turning off or down the lighting to avoid adverse effects during sensitive periods, e.g. bird migration.
- Paragraph 005(Reference ID: 31-003-20140306) of the PPG considers the character of the area and surrounding environment with reference to how these may affect what is considered to be an appropriate level of lighting for the type of development proposed. It cautions to avoid glare and an appropriate selection of lighting so that it fulfils its purpose without over-lighting.

15.14. British Standards (BS) provide criterions that are intended to set a standard of quality for goods and services. BS documents applicable to both commercial and residential development of relevance to lighting include the following:

- BS 5489-1:2013 – Code of practice for the design of road lighting – Part 1 (7): lighting of roads and public amenity areas. This document provides guidance on the design of lighting for roads and public amenity areas for identification of requirements and how they should be considered.
- BS EN 13201-2:2003 – Code of practice the design of road lighting – Part 2 (8): performance requirements. This document provides performance requirements for lighting installed for roads or public areas in the form of lux levels and uniformities.
- BS EN 12464-2:2007 Lighting of work places - Part 2 (9): Outdoor work places. This document provides guidance for a variety of outdoor workplaces and the anticipated lighting requirements, in the form of lux levels and uniformities that are used as part of standard practice.

15.15. The relevant guidance documents which assist with defining acceptable standards and thresholds for exterior lighting installations include the following:

- Chartered Institute of Building Services Engineers (CIBSE)/Society of Light and Lighting (SLL) – Lighting Guide 6 – The Outdoor Environment (2016) (10);
- CIBSE/SLL – Lighting Factfile 7 – Design and Assessment of Exterior Lighting Schemes (2011) (11);
- CIBSE/ SLL – Lighting Handbook (2012) (12);
- Institution of Lighting Professionals (ILP) – Guidance Notes for the Reduction of Obtrusive Light (2020) (13) (the 'ILP Guidance');
- Institute of Lighting Professionals and the Bat Conservation Trust – Guidance Note 8 Bats and Artificial Lighting (2018)
- Secured by Design – Lighting Against Crime (2011) (15);
- CIE 150:2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (16);
- 'Preparation of Environmental Statements for Planning Projects that Require Environmental Assessment - a Good Practice Guide' (DETR 1995 and 1998) (17); and
- CIBSE TR24 – A Practical Guide to the Development of Public Lighting Policy for Local Authorities (2009).
- The ILP's 'Guidance Notes for the Reduction of Obtrusive Light' (GN01:2021) provides the basis for analysis when defining whether an installation will be obtrusive to the environment and neighbouring properties. It assists in quantifying and providing acceptable maximum threshold recommendations for light spill, sky glow and glare.
- The ILP's Professional Lighting Guide 05 (PLG05), 'The Brightness of Illuminated Advertisements [2014]' provides recommended luminance limits for illuminated advertisements.

## Assessment Methodology and Significance Criteria

15.16. A site visit was carried out to record the existing lighting conditions and assist with the identification of receptors who might experience significant effect in their lighting conditions. Table 15.1 lists the identified receptors and the reason for each selection. Figure 15.2 illustrates the location of the receptors.

Table 15.1

| Reference | Receptor / Receptor Type | Reason for Identification |
|---|---|---|
| R1 | Ashton Canal (SBI) / Ecological Receptor | Potential effect of exterior lighting to commuting and foraging wildlife |
| R2 | Philips Park / Ecological Receptor | Potential effect of exterior lighting to commuting and foraging wildlife |
| R3 | Residential Properties along Alan Turing Way & Stuart Street & Gibbon Street / Residential Receptor [Ground and First Floor Levels] | Potential of skyglow for indirect views |
| R3A | Residential Properties along Alan Turing Way & Stuart Street & Gibbon Street / Residential Receptor [Upper Levels] | Potential direct views to the Site, glare and skyglow for indirect views |
| R4 | Residential Properties along Bradford Road / Residential Receptor [Ground and First Floor Levels] | Potential of skyglow for indirect views |
| R4A | Residential Properties along Bradford Road / Residential Receptor / Residential Receptor [Upper Levels] | Potential direct views to the Site, glare and skyglow for indirect views |
| R5 | Alan Turing Way / Motorised Traffic Route Receptor | Potential light spill on the highway above the required light levels for this type of road. |

15.17. By their nature, the effects which are assessed as part of a new or changed lighting installation are direct and reversible.

15.18. The lighting assessment at Appendix 15.1 includes an indicative layout with references for the suggested luminaires as well as diagrams showing the horizontal and/ or vertical illuminance at critical locations as produced by the lighting simulation.

15.19. The impact of a new or changed lighting condition on each receptor can be described in qualitative terms as a function of the magnitude of the change and the sensitivity of the receptor. Their nature, the effects which are assessed as part of a new or changed lighting installation are direct and reversible.

15.20. The magnitude of the impact of changes in the lighting conditions for each receptor can vary from Major to Negligible and the effect is evaluated based on the criteria presented in Table 15.3.

Table 15.3 Impact Magnitude

| Magnitude of Impact | Criteria for assessing impact |
|---|---|
| Major | Increases or decreases to the local lighting condition are expected to be extensive, unmistakable and noticeable. Often this is linked to negative change which may be considered to be highly intrusive where the appearance, characteristics and effects of an installation to identified receptors may contribute to disruption, abandonment or predation to local wildlife / habitat and disruption or discomfort to local residents. |
| Moderate | Increases or decreases to the local lighting condition are expected to be noticeable, distinct, but not always intrusive. Change to the lighting condition affecting the appearance, characteristics and effects of an installation to identified receptors. |
| Minor | Small change to an existing lighting condition or new lighting condition creates only a low level of change or new effects to identified receptors. An increase or decrease in brightness, sky glow, light spill or glare is expected to be noticeable but not to a high degree. |
| Negligible | No perceptible change to the local area lighting condition, barely noticeable increase or decrease in brightness, light spill, local area sky glow or glare. Meets good practice lighting criteria and is considered the equivalent of no change to identified receptors |

15.21. The sensitivity of a receptor to changes in the lighting conditions vary from high to low. The effect of the change is described in Table 15.4.

Table 15.4 Receptor Sensitivity

| Sensitivity | Receptors |
|---|---|
| High | Residential buildings with minimal to no baseline exposure to lighting in a typically rural environment and habitats with a high level of light sensitive ecology or protected/sensitive species frequently found utilising a Site for commuting/foraging.<br>There is generally no if not low exposure to lighting, and street lighting is expected to be strictly regulated or not required. Instances of street lighting may be in use part-night or throughout the full night and during dusk and dawn periods. All other lighting is expected to be off, or be dimmed, between the hours of midnight (00:00) to 05.00, or other agreed dark period. |
| Moderate | Residential buildings with baseline exposure to a moderate amount of lighting in a typically urban environment, land used by sensitive/protected species for foraging/commuting activities and habitats with moderate level of light sensitive ecology.<br>There is generally low to moderate exposure to lighting other than street lighting which is regulated, often including dusk and dawn periods, but typically off between the hours of midnight (00:00) to 05.00, or another agreed dark period. |
| Low | Industrial buildings, buildings with no windows, places that do not support habitat or foraging.<br>There may be a high exposure to lighting other than statutory lighting during night time hours, including dusk, dawn and midnight (00:00) to 05.00. |

15.22. Significance criteria, are used to evaluate the likely effects of a lighting condition for identified receptors given their sensitivity and the magnitude of the change experienced.

15.23. Each receptor can be assigned with a significance level from the impact significance matrix described in Table 15.5.

Table 15.5 Impact Significance Matrix

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Major | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

## Baseline Conditions

15.24. To obtain the baseline lighting conditions within the immediate surrounding of the Site, a survey was carried out on the 24th of January 2023. The survey was carried out during low-light hours (21:30 to 24:00).

15.25. Lighting measurement locations are shown on Figure 15.3. Measurements were taken at a distance up to 500m from the Proposed Development. Measurement points are set at circa 40m to 50m intervals in the immediate surrounding- 150m radius- of the Site (points 11 to 25). Further measurements were taken at areas where residents are most likely to be affected within a 500m radius of the Proposed Development. This primarily focuses on the residential buildings to the north of Viaduct Road (points 5 to 8) and to the south of Philips Park (points 26 to 29) as indicated above.

15.26. Where measurement points are located local to residential properties, the readings are taken as close to the residential boundary as possible whilst keeping within the public realm.

15.27. The baseline light level readings are described in Table 15.6.

Table 15.6 Baseline Conditions- Light Levels Readings

| Point | Illuminance | | |
|---|---|---|---|
| | Horizontal | Vertical | |
| | | Towards the Site | Away from the Site |
| 1 | 30.12 | 11.71 | 5.06 |
| 2 | 4.50 | 0.32 | 2.37 |
| 3 | 14.61 | 1.61 | - |
| 4 | 10.43 | 0.33 | - |
| 5 | 4.52 | 7.92 | 0.31 |
| 6 | 4.43 | 6.06 | 0 |

| | | | |
|---|---|---|---|
| 7 | 4.05 | 26.05 | 0 |
| 8 | 13.72 | 10.63 | 6.56 |
| 9 | 30.21 | 10.56 | 11.01 |
| 10 | 10.08 | 6.41 | - |
| 11 | 51.35 | 0.90 | 21.51 |
| 12 | 4.32 | 0.98 | 0.54 |
| 13 | 4.02 | 1.00 | 0.22 |
| 14 | 3.43 | 7.23 | 0.67 |
| 15 | 3.43 | 1.17 | 0.23 |
| 16 | 11.80 | 0.28 | 0.15 |
| 17 | 13.57 | 16.04 | 6.67 |
| 18 | 13.57 | 2.73 | 8.35 |

15.28. The ILP Guidance recommends that the immediate environment is classified according to specific Environmental Zone Criteria for light nuisance into windows. The criteria are defined in Table 15.7.

Table 15.7 Environmental Zone Criteria

| Zone | Surrounding | Lighting Environment | Examples |
|---|---|---|---|
| E0 | Protected | Dark | UNESCO Starlight Reserves, IDA Dark Sky Parks |
| E1 | Natural | Intrinsically dark | National parks, Areas of Outstanding Natural Beauty etc. |
| E2 | Rural | Low district brightness | Village or relatively dark outer suburban location |
| E3 | Suburban | Medium district brightness | Small town centres or suburban locations |
| E4 | Urban | High district brightness | Town/city centres with high levels of night-time activity |

15.29. The Site is considered to belong to an E3 Suburban Environmental Zone. It is surrounded by Joe Mercer Way, Sportcity Way and Alan Turing Way, which are all well-lit. The path adjacent to Ashton Canal is lit by lighting columns. The residential areas south of Ashton New Road and west of New Viaduct Street are obstructed from direct view to the Site by existing structures and landform respectively.

15.30. The Proposed Development will introduce functional lighting to illuminate the public realm, façade lighting as well as three media screens and two illuminated signs at the fifth level of the Proposed Development. The lighting installation is described in Appendix 15.1.

15.31. The Proposed Development is located in an area with high street light levels and is situated adjacent to buildings with high intensity light sources (including the Etihad Stadium, Manchester Regional Area). Thus, the night time image of the area has already been affected by existing development.

15.32. For the purposes of this assessment, it is assumed that the future baseline in the event of the Site not being developed would remain the same as the existing lighting condition.

## Identification and Evaluation of Significant Effects

## Construction Phase Effects

15.33. Artificial lighting will be required during the construction phase at early evening hours while works are carried out. Low illuminance safety lighting will be operating after working hours. The effect would be temporary and variable depending on the location of the construction activity in relation to each receptor. It is considered that the magnitude of change will be minor and the significance of the effect will be minor adverse / negligible for all recipients.

## Operational Phase Effects

15.34. The effects of the Proposed Development at each identified receptor location is described below.

### Wildlife/Habitat Receptors [R1]

15.35. Wildlife or habitat receptors are species that are generally found local to the Site with reference to the ecological survey.

15.36. The highest potential for wildlife/habitat occurs in areas of dense planting and local wetlands and waterways which occur, primarily at the Ashton Canal Corridor, but potentially also within the Site boundary.

15.37. Wildlife – Habitat/Foraging: Wildlife using the Site or Ashton Canal as habitat or for commuting and foraging, are expected to have a 'High' sensitivity to a change in lighting condition.

15.38. The functional public realm lighting introduced by the Proposed Development will replace existing artificial external lighting (placed south of the Etihad Campus tram queue arrival canopies). The Proposed Development will contain 3nr LED media screens of which 2nr arefacing the Etihad Campus station and oncoming visitors along Joe Mercer Way, and 1nr is on East façade of the hotel building facing Alan Turing Way . The LED screens will be fully controllable, dimmable and programmable. The light spill condition from the Proposed Development onto the Ashton Canal is considered to be 'Minor'.

Table 15.8 Operational effect of Proposed Development on the Ashton Canal - Receptor R1.

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

## Wildlife/Habitat Receptors [R2]

15.39. Wildlife – Habitat/Foraging: Wildlife using the Site or Ashton Canal as habitat or for commuting and foraging, are expected to have a 'High' sensitivity to a change in lighting condition.

15.40. The functional public realm lighting introduced by the Proposed Development will replace existing artificial external lighting (placed south of the Etihad Campus tram queue arrival canopies). The Proposed Development will contain LED media screens, facing the Etihad Campus station and oncoming visitors along Joe Mercer Way. The LED screens will be fully controllable, dimmable and programmable. Philips Park is 120-metres away (at the closest point), but will be fully baffled by the Co-Op Live development north of the canal. The light spill condition from the Proposed Development onto the Ashton Canal is considered to be 'Negligible' due to the distance and architectural massing of the area.

Table 15.9 Operational effect of Proposed Development on Philips Park- Receptor R2

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

## Residential receptors [R3 and R3A]

15.41. The residences along Alan Turing Way are considered to have a 'High' sensitivity to new lighting installations.

15.42. While operational the Proposed Development will have limited visual impact with respect to light spill, glare and skyglow from direct views from the residential properties immediate east of Alan Turing Way. Considering a carefully implemented new lighting installation, the Proposed Development's hotel massing situated on the East side of the development, and the Proposed Development's LED media screens face away from the residences along Alan Turing Way, the effects of light spill, glare and sky glow are considered to be 'negligible'.

Table 15.10 Operational effect of Proposed Development on Residences along Alan Turing Way - Receptor R3 and R3A.

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

### Residential receptors [R4 and R4A]

15.43. The residences along Bradford Road are considered to have a 'High' sensitivity to new lighting installations.

15.44. Most residences along Bradford Road are a two-storey massing. Due to the low level massing, most residences at ground level and first floor level will have 'low' sensitivity to change and will have a 'negligible' impact.

15.45. For higher level residential buildings along Bradford Road, while operational the Proposed Development will have very limited visual impact with respect to light spill, glare and skyglow from direct views due to the distance (over 500-metres), restricted and/or baffled views due to architectural massing, the viaduct and tree foliage. Considering a carefully implemented new lighting installation, and controllable LED media screens, the effects of light spill, glare and sky glow are considered to be 'negligible'.

Table 15.11 Operational effect of Proposed Development on Residences along Bradford Road - Receptors R4.

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

Table 15.12 Operational effect of Proposed Development on Residences along Bradford Road - Receptors R4A.

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

### Motorised Traffic Routes [R5]

15.46. Excess light spill onto a motorised traffic route may rise the light levels beyond the suggested values and lower the light uniformity.

15.47. The functional public realm lighting introduced by the Proposed Development will replace existing artificial external lighting. The Proposed Development will contain LED media screens, facing the Etihad Campus station and oncoming visitors along Joe Mercer Way; not facing or effecting the motorised traffic along Alan Turing Way. Therefore, a carefully considered lighting scheme is considered to have 'Negligible' due to the distance and architectural massing of the area.

Table 15.13 Operational effect of Proposed Development on Alan Turing Way - Receptor R5

| Magnitude | Sensitivity | | |
|---|---|---|---|
| | High | Moderate | Low |
| Substantial | Major Adverse-Beneficial | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial |
| Moderate | Major- Moderate Adverse-Beneficial | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial |
| Minor | Moderate- Minor Adverse-Beneficial | Minor Adverse-Beneficial | Minor- Negligible |
| Negligible | Negligible | Negligible | Negligible |

## Mitigation Measures

15.48. During construction, compound locations would require careful siting to minimise light pollution. The lighting installation should be designed following relevant lighting standard and guidance to provide a sensitive and appropriate lighting techniques and luminaire selections.

15.49. During operation, the lighting installation will be based on requirements set at relevant standards and suggestions by guidelines and good practice documents. The installation of a lighting control system that will allow the lighting installation to dim depending on daylight availability and set-dim with timeclock

functionality, will minimise the magnitude of the effect. With these control measures in place, no further mitigation is expected to be required.

## Cumulative Effects

15.50. Although the construction and operational installations will be designed to respect and maintain the integrity of an environmental zoning categorisation of E3, and will be designed to meet best practice standards, there is the potential of additional increase in the night time lighting condition in the vicinity. Mitigation through design measures such as careful selection of luminaires, implementation of lighting control devices and restricted operational hours (e.g. curfews) adapt usage and will result in a negligible to minor adverse change to the ambient night time lighting condition.

## Residual Effects

15.51. With the implementation of the mitigation measures described above, it is anticipated that there will not be any additional residual effects.

Table 15.14 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

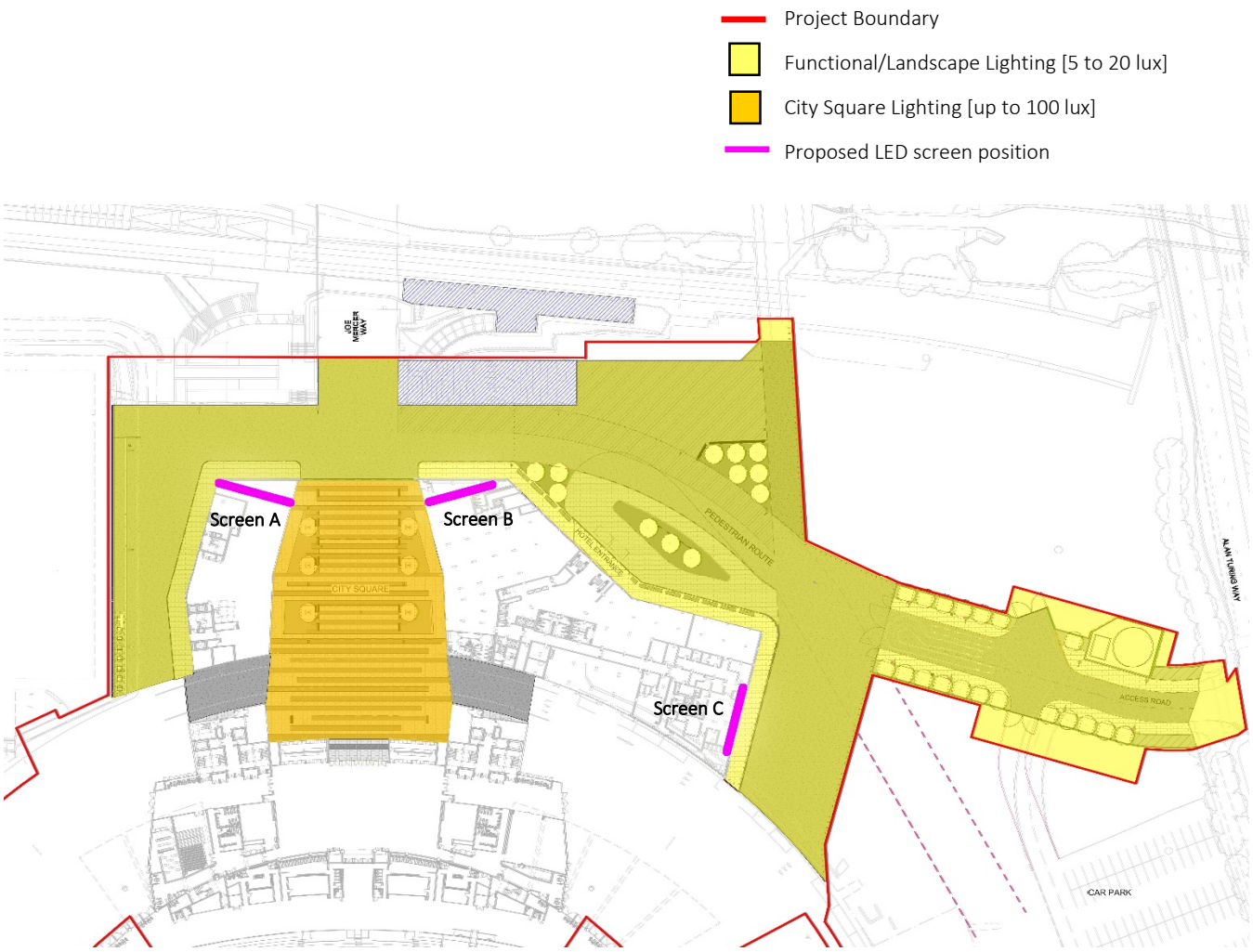
| Receptor(s) | Likely Significant Effects | Mitigation Measures | Means of Implementation | Residual Effects |
|---|---|---|---|---|
| **Construction** | | | | |
| R1 – Ashton Canal / Ecology | Negligible | None | Design | None |
| R2 – Philips Park / Ecology | Negligible | None | Design | None |
| R3 – Alan Turing Way – Low Level / Residential Properties | Negligible | None | Design | None |
| R3A – Alan Turing Way – High Level / Residential Properties | Negligible | None | Design | None |
| R4 – Bradford Road – Low Level / Residential Properties | Negligible | None | Design | None |
| R4A – Bradford Road – High Level / Residential Properties | Negligible | None | Design | None |
| R5 – Alan Turing Way / Motorised Traffic | Negligible | None | Design | None |
| **Operational** | | | | |
| R1 – Ashton Canal / Ecology | Minor Adverse | Lighting Control System | Design + Lighting Controls | None |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Means of Implementation | Residual Effects |
|---|---|---|---|---|
| R2 – Philips Park / Ecology | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R3 – Alan Turing Way – Low Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R3A – Alan Turing Way – High Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R4 – Bradford Road – Low Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R4A – Bradford Road – High Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R5 – Alan Turing Way / Motorised Traffic | Negligible | Lighting Control System | Design + Lighting Controls | None |

## Reference List

15.52. This ES Chapter has been prepared by reference to the following:

- Environmental Protection Act 1990
- National Planning Policy Framework 2019
- Planning Practice Guidance 2019
- BS 5489-1:2013 Code of Practice for the design of road lighting
- EN 12464-2 Lighting of work places (Outdoor work places)
- EN 13201-2-2003 Road Lighting - Performance Requirements
- CIBSE- SLL LG06 Outdoor Lighting
- CIBSE- SLL Factfile 7 Design and Assessment of Exterior Lighting Schemes (2011)
- CIBSE/ SLL – Lighting Handbook
- Institution of Lighting Professionals (ILP) – Guidance Notes for the Reduction of Obtrusive Light (2020)
- Institute of Lighting Professionals and the Bat Conservation Trust – Guidance Note 8 Bats and Artificial Lighting (2018)
- Secured by Design – Lighting Against Crime (2011)
- CIE 150:2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations
- 'Preparation of Environmental Statements for Planning Projects that Require Environmental Assessment - a Good Practice Guide' (DETR 1995 and 1998)
- CIBSE TR24 – A Practical Guide to the Development of Public Lighting Policy for Local Authorities (2009)

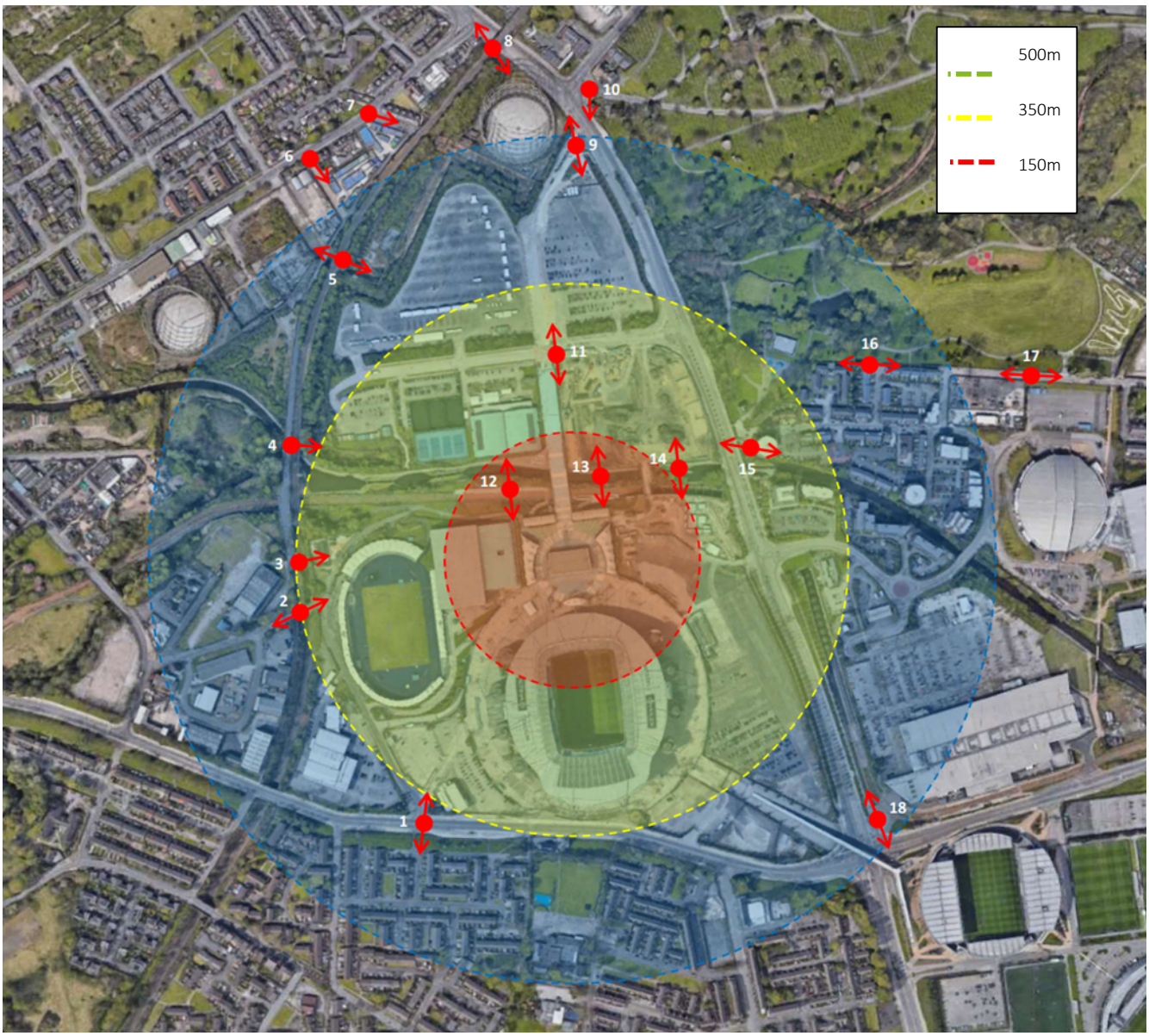



| | | | | |
|---|---|---|---|---|
| | **Figure:** | **15.1** | | |
| | **Title:** | **External Lighting Treatments** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **04/04/2023** | **Scale:** | **Scale /NTS** |




Lighting Receptors:
R1 – Ashton Canal (ecological)
R2 – Philips Park / Philips Cemetery (ecological)
R3 – Alan Turing Way & Stuart Lane – lower floors (residential)
R3A – Alan Turing Way & Stuart Lane – higher floors (residential)
R4 – Bradford Road – lower floors (residential)
R4A – Bradford Road – lower floors (residential)
R5 – Alan Turing Way (motorised traffic route)

| | | | | |
|---|---|---|---|---|
| | **Figure:** | **15.2** | | |
| | **Title:** | **Lighting Receptors** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **24/01/2023** | **Scale:** | **Scale /NTS** |




| | | | | |
|---|---|---|---|---|
| | **Figure:** | **15.3** | | |
| | **Title:** | **Lighting Survey Measurement Points** | | |
| | **Project:** | **North Stand, Manchester** | | |
| | **Date:** | **24/01/2023** | **Scale:** | **Scale /NTS** |

# 16. Socio-Economic

## Introduction

16.1. This Chapter of the ES has been prepared by Deloitte LLP, drawing on the Economic Impact Assessment prepared by Amion. It assesses the likely socio-economic impacts of the Proposed Development upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.

16.2. This Chapter is accompanied by the following technical appendix:

- Appendix 16.1: North Stand Development: **Error! Reference source not found.** (April 2023), prepared by Amion.

| | | |
|---|---|---|
| | Lead Author | Reviewer |
| Name | Eve Grant | John Cooper |
| Company | Deloitte LLP | Deloitte LLP |
| Qualifications/Accreditations relevant to technical area | Accredited Member of the Royal Town Planning Institute | Accredited Member of the Royal Town Planning Institute |
| Does the practitioner hold any IEMA qualification? | No. | No. |
| Company hold IEMA QMark? | Yes | |
| Years technical experience (in technical area) | 20 | 25 |
| Number of EIA's delivered to date | 25+ | 100+ |

## Limitations and Assumptions

16.3. There is no recognised criteria for the assessment of socio-economic impacts as part of the Environmental Impact Assessments. Deloitte has therefore drawn on their professional expertise, knowledge of overarching guidance and experience of working in the subject area, and taken a structured approach to quantifying and assessing the scale and nature of potential socio-economic effects relative to baseline conditions. In cases where impacts could not be quantified, a qualitative judgement has been made, drawing on professional experience.

16.4. This data referenced in this Chapter draws upon information from the applicant as well as from the accompanying Economic Impact Assessment prepared by Amion, which in turn draws from the most up to date data from official published sources. Amion has gathered data most closely aligning to the chosen Assessment Area. The assessment has sought to estimate both the gross and net additional impact of the programme, at the Manchester and Greater Manchester levels, and reflect on local impact to East Manchester, in line with appraisal guidance

## Legislative and Policy Context

16.5. There is no legislation relevant to the assessment reported in this Chapter.

16.6. The following policy and documents have informed the assessment of effects within this Chapter:

- National Planning Policy Framework
- Core Strategy
- Saved Policies of the Manchester UDP
- Draft Places for Everyone
- Greater Manchester Strategy
- Eastlands Regeneration Framework

16.7. The following guidance has informed the assessment of effects within this Chapter:

- HM Treasury Green Book (Appraisal and Evaluation in Central Government).
- the Homes England Additionality Guide (formerly Homes and Communities Agency).

## Assessment Methodology and Significance Criteria

16.8. This section of the ES Chapter outlines the methodology used to establish the potential economic and social effects of the Proposed Development assessed against the baseline conditions. The effects of the Proposed Development are considered at varying spatial levels according to the nature of the effect considered.

### EIA Scoping

16.9. An EIA Scoping Report was prepared by Deloitte with input from the technical consultant team for the project (See Appendix 2.2). The EIA Scoping Report was submitted to MCC as the LPA on 6 March 2023 and statutory consultees were consulted in relation to the proposed content of the EIA and the scope of the associated EIA assessments. A formal scoping opinion was received on 12 April 2023 (see Appendix 2.3) which confirms that the Proposed Development would have potential socio-economic effects which are more than local significance, and therefore socio-economic impacts should be scoped-in to the EIA.

16.10. Impact on social infrastructure, including access to open space and amenity and Entertainment and Leisure Provision has been scoped out of this chapter, given it is an inherent characteristic of the Proposed Development to enhances the Etihad Campus' reputation as a sports and leisure visitor destination of national significance, providing supplementary commercial, retail, and hotel offerings that will act as a catalyst for the expansion of a year-round world-class sports and entertainment destination.

### Baseline Study

16.11. The baseline data has been sourced from the Economic Impact Assessment prepared by Amion (Appendix 16.1).

16.12. The relevant baseline data has been analysed at the Site level. Baseline data relates to City Football Group's (CFG) existing on-site employment, employment through off-site expenditure and indirect and induced employment as a result of the Applicant's existing activities. The baseline also therefore considers the CFG's existing total employment and GVA impact. As the private owner and operator of the Applicant, this is considered to be appropriate given that CFG operations in Greater Manchester are inherently linked to the operations of the Applicant.

16.13. The expansion of the South Stand took place in accordance with a planning permission granted in 2014, which also approved an extension of the North Stand with the current proposals falling within the ambit of that approved capacity. This planning permission has been lawfully implemented and therefore remains extant; however, for the purpose of this assessment, the South Stand expansion and Co-op Live (under

construction) are considered within the baseline assessments. The previously approved North Stand proposals are not.

## Assessment Approach

16.14. The socio-economic assessment has been considered against existing socio-economic conditions. The principal economic effect of the Proposed Development is considered relative to Manchester (city) and the Greater Manchester (regional), as these represent the principal labour market catchment areas. The Assessment also considers the socio-economic impact at a more local level in East Manchester.

16.15. Where possible, a quantitative assessment has been undertaken. Of key importance in assessing the impact of the project on the local and regional economy is the extent to which new activity is truly additional. Furthermore, it is important to understand who is likely to benefit from the impacts generated. In order to assess the net additional impact of the proposals and overall anticipated additionality of the project, the following factors have therefore been considered:

- leakage – the extent to which economic outputs benefit those outside of Greater Manchester;
- displacement – the extent to which the project displaces economic activity elsewhere in Greater Manchester;
- multiplier effects – further economic activity associated with additional local income and local supplier purchases; and
- deadweight – economic activity that will occur even if the project does not go ahead.

## Methodology and Significance Criteria

16.16. Since there are no specific technical criteria to assess the significance of socio-economic effects, assessment will take place in accordance with the overarching EIA methodology (Chapter 2 of this ES) using professional judgement informed by experiences of similar projects.

16.17. The significance of socio-economic effects has broadly been determined by considering:

- The value of the resource (international, national, regional and local level importance);
- The magnitude of the effect;
- The duration of the effect;
- The reversibility of the effect; and
- The number of sensitive receptors.

16.18. The magnitude of socio-economic impacts will be assessed in line with the approach outlined in Table 2.3 in Chapter 2. In addition to the magnitude, the duration of impact will also be considered with the impacts ranging from those that are likely to be temporary or permanent.

16.19. The sensitivity of a receptor is based on the relative importance of the receptor using the framework outlined in Table 2.4 in Chapter 2.

16.20. The significance of the impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The Impact Significance Matrix is set out in Table 2.5 in Chapter 2. All impacts assessed as 'moderate' or 'major' are considered to be 'significant' in EIA terms.

16.21. The nature of the effect has been described as either adverse or beneficial as follows:

- Beneficial – An advantageous effect to a receptor;
- Adverse – A detrimental effect to a receptor; and
- Neutral – An effect that is on balance both beneficial and adverse.

16.22. In general, temporary, short to medium-term significant effects are considered to be those associated with the construction works. Long-term effects are those associated with the Proposed Development once complete and operational. The moderate and major effects are considered to be 'significant'.

16.23. Note that where moderate and major effects are identified, these are considered to be 'significant'. Where an effect is assessed as being within the 'Moderate/Minor' category professional judgment has been used to determine if it is considered a significant effect or not.

## Baseline Conditions

16.24. This section summarises the existing socio-economic conditions of the Site. The relevant baseline data has been accessed and analysed in relation to the Applicant's existing on-site employment, employment through off-site visitor expenditure and indirect and induced employment as a result of the Applicants existing activities. The baseline also considers the Applicant's existing GVA impact and employment at the new Co-op Live Arena

16.25. This information provides the baseline against which the socio-economic effects of the Proposed Development are assessed.

### Socio-Economic Profile of the Site

#### On-site Employment

16.26. CFG is already a significant employer with 891 people employed in Manchester in a variety of full-time and part-time roles (845 FTE). On matchdays and event days, an additional 1,885 people are employed through a number of third parties including stewards, catering staff, cleaning staff and car parking staff which equates to 255 full time equivalents.

16.27. Based on information provided by CFG, it is estimated that current operations support 2,776 jobs including full time, part time and casual work. This equates to around 1,100 full time equivalent jobs (FTE) on site[1].

#### Employment through off-site visitor expenditure

16.28. In addition to existing employment, CFG creates economic impact by attracting visitors to Manchester who spend with other businesses (hotels, bars, shops, taxis etc.) which in turn, creates and supports employment.

16.29. In a typical season, the Etihad Stadium has an aggregate football attendance of around 1.41m. On average, around 96% of attendees are home fans with around 61,000 away fans visiting the Etihad Stadium in a typical year. However, data provided by MCFC shows that a significant proportion of home fans live outside of Greater Manchester and many travel from overseas.

16.30. In addition to football attendance, the Etihad Stadium hosts a number of music concerts in the summer months. MCFC budgets for a minimum of four concerts per summer but in some years, the stadium has hosted as many as eight concerts. Five is considered typical in a year and, depending on who is touring, an attendance of 50,000 per concert is expected. Analysis of the concerts in 2022 shows the following origin of visitors:

- From Greater Manchester – 60,000
- From the rest of the UK – 187,000
- From overseas – 3,000

[1] Amion, 2023, Economic Impact Assessment (Appendix 16.1)

- Total – 250,000

16.31. In total therefore, a typical season would see approximately 1.66m visitors to the Etihad Stadium.

16.32. Data from Visit Britain[2] suggests that day visitors to Manchester spend £43.07 per head whilst overnight leisure visitors spend an average of £228.25 per trip. Meanwhile, ONS[3] data suggests that overseas visitors to Manchester spend an average of £430.56 per trip.

16.33. In estimating off-site visitor expenditure, it has been assumed that:

- all visitors from Greater Manchester are day visitors;
- 80% of visitors from the rest of UK are day visitors and 20% stay in Manchester; and
- all visitors from overseas stay in Manchester.

16.34. After accounting for fan expenditure within the Etihad Stadium (food, beverage, merchandise and programmes) it is estimated that the 1.66m annual visitors to the Etihad Stadium generate £109.6m of off-site visitor expenditure each year. This £109.6m of off-site visitor expenditure has been converted to FTE jobs by employing a metric derived from a Deloitte study[4] on behalf of Visit Britain in 2013 which asserts that £54,000 of visitor expenditure is required to support 1 FTE job. After inflating this figure to 2022 prices, it is estimated that visitors to the Etihad Stadium support 1,580 full time equivalent jobs elsewhere in the Greater Manchester visitor economy (2,370 jobs when part time and casual work is included).

16.35. Appendix 16.1 provides details of the existing off-site visitor expenditure as a result of CFG's operations in Greater Manchester. This is summarised in Table 16.4.

### Indirect and Induced Employment

16.36. CFG buys goods and services from other businesses which creates further rounds of indirect employment. In addition, employees use their wages and salaries to purchase additional goods and services which creates further rounds of employment. This is known as the induced effect.

16.37. To take account of the indirect and induced effects, a composite multiplier is applied to the employment figures set out above. A multiplier of 1.56 has been applied at the Greater Manchester level which takes account of national guidance and benchmarks and specifically the HCA Additionality Guide which provides specific figures for recreation projects.

16.38. Appendix 16.1 provides details of the existing indirect and induced employment as a result of CFG's operations in Greater Manchester. This is summarised in Table 16.4.

### Total Employment

16.39. Taking account of existing on-site employment; off-site visitor expenditure employment; indirect supply chain employment; and induced employment, it is estimated that CFG's existing operations already support 4,180 full time equivalent jobs within Greater Manchester (or 7,400 full time, part time and casual jobs.

16.40. Data from the Office of National Statistics (based on census data) shows that 62% of workers in Manchester travel in from elsewhere in Greater Manchester and the North West. It is therefore assumed that around 1,588 of the 4,180 FTE jobs supported by CFG's existing activity are taken by residents of Manchester[5].

[2] Great Britain Day Visitor Survey 2019 and Great Britain Tourism Survey 2019
[3] International Passenger Survey 2019
[4] The economic contribution of the tourism economy in the UK, Deloitte and Oxford Economics for Visit Britain, 2013
[5] Ibid

16.41. Appendix 16.1 provides details of the total existing employment baseline as a result of CFG's operations in Greater Manchester. This is summarised in Table 16.4.

### Employment at Co-op Live

16.42. The new Co-op Live Arena currently under construction will create a critical mass that will deliver long-term meaningful impact in jobs, skills development and business growth. Therefore, the employment and GVA impacts of the Arena should be considered as part of the baseline together with the existing impacts of CFG's operations.

16.43. According to the Co-op Live Arena planning application (ref: 126431/FO/2020), the Arena is expected to create a net gain of 586 FTE jobs as a result of its on-site operations. In addition, it is expected to attract attendance of 1m per annum with off-site visitor expenditure estimated at £36m per annum which could support a further 580 FTE jobs. In total, the Co-op Live Arena is expected to support 1,166 jobs per annum[6].

### Total GVA

16.44. GVA is a measure of the economic value of goods and services produced in an area[7]. CFG's current employment and economic activity together with that expected from the Co-op Live Arena is estimated to support £213.7m of GVA in Greater Manchester every year[8].

16.45. This is summarised in Table 16.4 and further information on how this baseline figure is calculated can be found in Appendix 16.1.

## Future Baseline

16.46. The Site has an extant planning permission for expansion of the North Stand. Whilst that could be delivered under the terms of the planning permission, it does not represent the preferred design, nor would it support the distinctive range of uses attached to the stadium expansion proposals, that would further support the creation of a world-class entertainment and leisure destination, which are ultimately the catalysts for significant socio-economic impact resulting from the Proposed Development. As such, if the Proposed Development did not go ahead, it is unlikely that the future baseline within the Site would change significantly in terms of the current baseline conditions.

# Identification and Evaluation of Significant Effects

## Construction Effects

16.47. This section of this ES Chapter analyses the scale, duration and significance of socio-economic effects relative to the baseline socio-economic conditions presented within the previous sections of this Chapter during the construction phase.

16.48. It estimates the gross construction employment arising from the Proposed Development and then takes into account leakage, displacement and multiplier effects in order to assess net impacts on the local and regional economies.

### Relevant Aspects of the Scheme

[6] Ibid
[7] It is defined by the Office for National Statistics (ONS) as "… the difference between the value of goods and services produced and the cost of raw materials and other inputs which are used up in production."
[8] Amion, 2023, Economic Impact Assessment (Appendix 16.1)

16.49. Construction activity will result in employment creation which represents a positive economic effect that can be estimated as the function of the scale and type of construction (infrastructure and buildings).

16.50. It is assumed that the Proposed Development will involve a construction programme of approximately three years. Although temporary in nature, construction employment has positive economic effects, contributing to increased output in the UK economy.

### Construction Employment and Economic Effects

16.51. The construction works associated with the Proposed Development will generate new construction employment opportunities. The scale of construction employment created has been estimated using standard ratios for gross output per employee in the construction sector. The following sections estimate gross construction employment arising from the Proposed Development and then consider leakage, displacement and multiplier effects in order to assess net impacts on the local and regional economies.

#### Construction Employment

16.52. Although construction jobs are temporary, they represent a positive economic effect that can be estimated as a function of the scale and type of construction. With a construction period of approximately three years, the Economic Impact Assessment in Appendix 16.1 details the gross direct temporary employment alongside the indirect and induced employment effects for Manchester and Greater Manchester as a result of the Proposed Development. This is summarised in Table 16.2 below.

16.53. The Applicant will encourage its construction partners to use a significant amount of local labour, engage with well-established local supply chains and create meaningful apprenticeships (78) and training opportunities for local people.

#### Net Additional GVA

16.54. To estimate the net additional impact during the construction phase, an allowance has been made for leakage, displacement and multiplier effects. The proposals could lead to some displacement of construction activity elsewhere in Manchester and Greater Manchester and a displacement rate of 20% and 30% has been applied respectively.

16.55. In addition, there will be additional rounds of employment through indirect and induced effects. To take account of these effects, a multiplier of 1.25 has been applied at the Manchester level and 1.46 at the Greater Manchester level which is informed by national guidance and benchmarks including the HCA's Additionality Guide and reflects the structure of the local economy[9].

16.56. Appendix 16.1 provides a detailed analysis of the net additional GVA impact of the Proposed Development during the construction phase for Manchester and Greater Manchester. This is summarised in Table 16.2 below.

Table 16.2: Construction Phase Net Additional GVA (source: Amion, 2023)

| | Manchester | Greater Manchester |
|---|---|---|
| Gross temporary employment (person years) | 2,678 | 2,678 |
| Indirect and induced effect | 669 | 1,232 |

[9] Ibid

| | Manchester | Greater Manchester |
|---|---|---|
| Total direct, indirect and induced employment | 3,347 | 3,910 |
| Displacement and leakage effect | -2,330 | -1,611 |
| Net additional temporary employment (person years) | 1,018 | 2,299 |
| GVA per FTE in construction in Greater Manchester | £83,138 | £83,138 |
| Net additional GVA (temporary) | £84,596,862 | £191,117,669 |

### Other Impacts from the construction phase

16.57. Alongside directly supporting employment through the construction works, the project will also create supply chain opportunities for businesses within Greater Manchester including through, for example, the purchase of construction equipment and supplies.

16.58. This Applicant is targeting circa 50% of its construction budget locally in line with these other projects. With a total project cost of £217.8m, it is expected that a minimum of £108.9m local supply chain expenditure will be created during the construction period.

16.59. The construction activity from the implementation of the project also provides a real opportunity to increase skills in the area. Based on the anticipated construction spend and assumptions relating to labour costs, average wages and new entrants, it is estimated that between 7,000 and 7,500 person weeks of training could be provided. In terms of apprenticeships, it is expected that up to 78 apprentices (39 new, 39 sustained) could be engaged during the project

16.60. Further information on training and apprenticeships and other social-value initiatives to be created through the construction phase of the Proposed Development can be found within the Social Value Toolkit submitted in support of this Application.

### Construction Phase Social Value

16.61. Social value has formed a key part of conversations with prospective contractors. Manchester City Football Club has identified potential contractors to deliver the North Stand Proposals, who have a demonstrable track record of unlocking a wide range of social value through the construction phase. The Applicant will encourage its construction partners to use a significant amount of local labour, engage with well-established local supply chains and create meaningful apprenticeships (39 new, 39 sustained) and training opportunities for local people.

16.62. Both proposed contractors social value plans are bespoke to each project, meaning they are further developed with their partners to ensure that maximum added value is being delivered on the project. They believe that collaboration is paramount and establish Social Value partnership groups with representatives from local organisations who they believe are critical in ensuring projects are not only successful but leave lasting legacies for the communities in which they work.

16.63. Discussions have taken place with Laing O'Rourke (LOR) as a potential contractor. LOR's approach would include:

- A bespoke social value plan developed and delivered by the contractor's Social Value Advisor, drawing on their extensive existing network to truly reach out and integrate with local initiatives in both neighbouring communities and the wider city.
- An employment drop-in centre, to be provided on site, for local members of the public who would like to enquire about training and employment opportunities.
- An educational engagement programme for local schools, colleges and universities, offing site visits, career talks, STEM activities and work experience placements.
- Collaboration with agencies and charities that focus on helping hard to reach groups and disadvantaged individuals back into employment and housing in order to support social mobility.
- Corporate volunteering days delivered to local charity and community groups, donating both labour and materials in kind.
- Setting and delivering against local spend targets; working with Manchester Work and Skills team and Greater Manchester Chamber of Commerce.
- Use of the Thrive platform to monitor and report on return on social investment, aligning with the Impact Evaluation Standards (IES) framework.

16.64. The estimated return on social investment based on the above list is £85 million, including social and local economic benefits.

16.65. Discussions have taken place with Sisk as a potential contractor. Sisk's approach would include:

- Collaborating with the other proposed partner contractor (LOR) to establish a relationship that maximises local impact.
- A bespoke social value plan that targets deprived members of the local community as well as the wider Manchester and Greater Manchester region. The plan would be developed by the Regional Social Value and Stakeholder Manager and delivered by Sisk's project expert.
- The social value plan would include:
- Employment and skills outreach into the community with local charity, and JobCentre partners.
- Work seeker work placements, local training, and Sector Based Work Academy programmes to fill vacancies.
- Entry level jobs filled with individuals from the local wards, targeting 30% of new starters from within Manchester.
- STEM, Career, and employability skills courses, for local schools, colleges, and universities.
- Mentoring and work placements for students over 16 years old.
- Targeted support for charities, volunteer and social enterprises using local knowledge, from research, surveys and guidance from the client and local authority.
- Setting and delivering against local spend and labour targets.
- Use of the Social Value Portal to monitor and report on return on social investment, aligning with the National Themes Outcomes and Measures (TOMs) framework.

16.66. The social value add on the above bullets is £26m.

### Summary of construction impact

16.67. Since construction employment is relatively mobile, it is not generally considered appropriate to assess the potential employment effects of the construction stage at the local level. In the context of a large labour pool of construction workers in Manchester, the direct, indirect and induced employment and expenditure

created by the temporary construction phase of the Proposed Development is assessed to result in a **moderate beneficial**, medium-term temporary effect on the Manchester economy.

16.68. There are no significant adverse socio-economic effects identified for the Proposed Development that require mitigation during the construction phase.

Table 16.3: Summary of socio-economic effects during construction.

| Receptor | Sensitivity | Description of Effect | Magnitude of Change / Impact | Effect Significance |
|---|---|---|---|---|
| **Manchester Workforce** | Moderate | 3,347 FTE direct, indirect and induced temporary jobs created during the construction phases within Manchester | Medium | **Moderate Beneficial (temporary)** |
| **Greater Manchester Workforce** | Moderate | 3,910 FTE direct, indirect and induced temporary jobs created during the construction phases within Greater Manchester<br><br>39 new and 39 sustained apprenticeships | Medium | **Moderate beneficial (temporary)** |
| **Net additional GVA in Manchester** | Moderate | £84,596,862 net additional GVA in Manchester | Medium | **Moderate beneficial (temporary)** |
| **Net additional GVA in Greater Manchester** | Moderate | £191,117,669 net additional GVA in Greater Manchester | Medium | **Moderate beneficial (temporary)** |

## Operational Phase

16.69. This section of the ES Chapter analyses the scale, duration and significance of socio-economic effects relative to the baseline socio-economic conditions recognised in the previous sections of this Chapter. Effects are assessed for the Proposed Development once completed and occupied.

### Relevant Aspects of the Scheme

16.70. Key aspects of the scheme to consider in the context of the socio-economic assessment of operational effects include:

- The existing active employment uses on the Site that currently support operational employment uses; and

- There are no residential buildings on the Site and as such it does not currently support a residential population.
- Once completed and operational the Proposed Development will generate employment opportunities within operational uses.
- The Proposed Development will include a number of employment generating uses including the expansion of the Etihad Stadium and creations of associated event spaces and hospitality, hotel, museum, club shop, visitor attractions and food and beverage uses.

### Operational Employment and Economic Effects

16.71. The Proposed Development will generate long-term jobs once completed and operational. In estimating operational job generation, it is important to consider not just gross effects of the Proposed Development but also net effects taking into account leakage, displacement and multiplier effects.

#### On-Site Employment

16.72. As a result of the North Stand Development, new on-site employment will be created.

16.73. It is estimated that 602 full time equivalent jobs will be created on-site (1,131 when part time and casual workers are taken into account) including:

- 223 full time equivalent jobs created in the 4,180 sqm of new commercial workspace (based on typical employment densities for co-working and managed workspaces);
- 133 full-time equivalent jobs created in the new 401-bed hotel (based on typical employment densities in mid-scale hotels);
- 92 full-time equivalent jobs created in the 2,300 sqm of new food and beverage units (based on typical employment densities for restaurants and cafes);
- 85 full time equivalent jobs created within MCFC's back-office functions (operations, legal, HR, finance, marketing etc.) based on an assumed 10% increase of existing CFG employment;
- 38 full time equivalent jobs created within the Etihad Stadium on catering, stewarding, security and car parking based on a 15% increase in overall stadium capacity and requiring around 285 additional people on any given matchday/event night;
- 11 full time equivalent jobs created in the new Etihad Stadium events space (City Hall) based on trading projections provided by the Applicant
- 9 full time equivalent jobs created in the new interactive visitor attraction based on employment levels at other similar venues (The O2, Tottenham, Anfield, ArcelorMittal Orbit and Cutty Sark);
- 7 full time equivalent jobs created in the new 1,408 sqm shop which is additional to existing employment within the club's retail operations (based on typical employment densities in retail); and
- 4 full time equivalent jobs created in the new 480 sqm museum which is additional to existing employment within the museum (based on typical employment densities within visitor attractions).

16.74. Upon completion of this phase of work and once fully operational, it is estimated that the site will support a total of 2,288 full time equivalent jobs(including existing employment and Co-Op Live). However, the number of actual jobs created will be higher once part-time and casual workers are taken into account and is likely to be in the order of 5,000 jobs.

16.75. Appendix 16.1 provides a detailed analysis of the on-site employment as a result of the Proposed Development during the operational phase. This is summarised in Table 16.4 below.

#### Indirect employment from off-site visitor expenditure

16.76. In addition to the onsite employment that will be created as a result of the new development, the site will generate further economic impact by attracting additional visitors to the area who will go on to spend with other businesses which in turn will create and support employment.

16.77. With stadium capacity increasing by 7,910 seats, annual matchday and concert attendance could increase from 1.66m to 1.91m (250,000 additional).

16.78. Furthermore, it is estimated that an additional 20,000 people will attend conferences, functions and events in the new events venue, City Hall.

16.79. In total therefore, a typical season would see approximately 1.93m visitors to the Etihad Stadium (an increase of 270,000).

16.80. Data from Visit Britain[10] suggests that day visitors to Manchester spend £43.07 per head whilst overnight leisure visitors spend an average of £228.25 per trip. Meanwhile, ONS[11] data suggests that overseas visitors to Manchester spend an average of £430.56 per trip.

16.81. In estimating off-site visitor expenditure, it has been assumed that:

- the number of season ticket holders will not increase but that the additional capacity will be taken by home supporting 'match-by-match' fans;
- the geographic profile of these additional visitors will reflect the existing profile of home supporting match-by-match ticket buyers (30% Greater Manchester, 50% rest of UK, 20% from overseas);
- all visitors from Greater Manchester are day visitors;
- 80% of visitors from the rest of UK are day visitors and 20% stay in Manchester; and
- all visitors from overseas stay in Manchester.

16.82. It is estimated that the 270,000 additional visitors to the Etihad Stadium will generate £35.8m of off-site visitor expenditure each year. This £35.8m of additional off-site visitor expenditure has been converted to FTE jobs by employing a metric derived from a Deloitte study[12] on behalf of Visit Britain in 2013 which asserts that £54,000 of visitor expenditure is required to support 1 FTE job. After inflating this figure to 2022 prices, it is estimated that visitors to the Etihad Stadium will support an additional 550 full time equivalent jobs in the Greater Manchester visitor economy (hotels, taxis, transports, parking, bars, retail and restaurants).

16.83. Taking account of existing activity and including Co-Op Live, off-site visitor expenditure associated with visitors will support 2,710 full time equivalent jobs (c.4,065 jobs when part time employment is taken into consideration).

16.84. Appendix 16.1 provides a detailed analysis of the indirect employment from off-site visitor expenditure as a result of the Proposed Development during the operational phase. This is summarised in Table 16.4 below.

16.85. Considering the additional annual spending by visitors to the Proposed Development it is assessed that there will be a likely major beneficial, long-term permanent effect at the local and City level and a minor beneficial, long-term permanent effect at all other spatial scales.

Indirect and Induced Employment

[10] Great Britain Day Visitor Survey 2019 and Great Britain Tourism Survey 2019
[11] International Passenger Survey 2019
[12] The economic contribution of the tourism economy in the UK, Deloitte and Oxford Economics for Visit Britain, 2013

16.86. In buying-in goods and services from the wider supply chain, the Applicant and its partners on-site will contribute to further rounds of indirect employment. In addition, employees use their wages and salaries to purchase additional goods and services which creates further rounds of employment. This is known as the induced effect.

16.87. To take account of the indirect and induced effects, a composite multiplier is applied to the employment figures. A multiplier of 1.56 has been applied at the Greater Manchester level which takes account of national guidance and benchmarks.

16.88. Appendix 16.1 provides a detailed analysis of the indirect and induced employment as a result of the Proposed Development during the operational phase. This is summarised in Table 16.4 below.

Total Employment and GVA Impact

16.89. Upon completion of the project, the Applicant will be supporting an estimated 5,975 full time equivalent jobs through on-site employment, employment created through off-site visitor expenditure, indirect supply chain employment and induced employment through household expenditure.

16.90. This is an increase of 1,795 full time equivalent jobs. The actual number of people employed will be much higher once part-time and casual working is accounted for (likely to be in the order of 2,925 additional jobs).

16.91. Data from the Office of National Statistics (based on census data) shows that 62% of workers in Manchester come from outside of the Manchester local authority and 16% of workers travel in from outside of Greater Manchester. It is therefore assumed that leakage is 62% at the Manchester level and 16% at the Greater Manchester level.

16.92. Given the very special and unique nature of the facilities being created it is considered that there will be no displacement of economic activity from elsewhere.

16.93. An assessment has been undertaken of the net additional GVA generated as a result of the operational jobs expected to be created through the project, which is explained further within Appendix 16.1.

16.94. Overall, it is estimated that the North Stand development, once fully operational, will add £71.7 million of net additional GVA per annum into the Greater Manchester economy. Since GVA is a workplace measure, leakage has been added back when considering net additional GVA.

16.95. Table 16.4 below outlines the total employment and GVA impact of the Proposed Development.

Table 16.4: Total Employment and GVA Impact during operation

| | Baseline | Future | Additional |
|---|---|---|---|
| On-site employment FTE | 1,100 | 1,700 | 600 |
| Off-site visitor expenditure employment FTE | 1,580 | 2,130 | 550 |
| Indirect and induced employment FTE | 1,500 | 2,145 | 645 |
| Co-Op Live | 1,166 | 1,166 | 0 |

| | Baseline | Future | Additional |
|---|---|---|---|
| Total full-time equivalent jobs | 5,346 | 7,141 | 1,795 |
| Total jobs including full time, part time and casual | 9,375 | 12,300 | 2,925 |
| GVA per FTE employee in GM visitor economy | £39,969 | £39,969 | £39,969 |
| Total GVA per annum | £213,674,274 | £285,418,629 | £71,744,355 |

16.96. The Proposed Development will create flexible employment opportunities for residents residing within the City, particularly residents residing within the Wards close to the Proposed Development. The Applicant would ensure that new employment opportunities arising from the Proposed Development are accessible to East Manchester residents and support the retention and attraction of talent to the city. They will look to implement strategies which support the hiring of people who live within walking distance.

16.97. The nature of the Proposed Development brings a consistency of use to the Etihad Campus, which might peak during event days, but remains constant throughout the year. This presents a range of opportunities for permanent, long-term employment within the operational uses, which will be targeted at local people. This is in addition to part time roles in relatively low skilled occupations, such as customer service, stewarding, hospitality, catering, cleaning and security.

16.98. The Applicant is committed to providing a range of employment, skills and training initiatives to maximise the accessibility of employment opportunities to local residents within the City, as detailed within the Social Value Toolkit submitted in support of this application.

16.99. Considering the additional net direct, indirect and induced employment created by the permanent employment of the Proposed Development, it is assessed that there will be a **moderate beneficial**, long-term, permanent effect on the labour market within Manchester, and a **minor beneficial**, long-term, permanent effect at the regional and national level during the operational phase.

Social Value

16.100. Manchester City Football Club is committed to ensuring as many jobs as possible go to local people and will look to implement strategies which support the hiring of people who live within walking distance.

16.101. Manchester City Football Club would ensure that new employment opportunities arising from the Proposed Development are accessible to East Manchester residents and support the retention and attraction of talent to the city.

16.102. The range of employment opportunities within the hotel and wider amenity uses include:

- Catering and service
- Hospitality
- Event management
- Customer Care
- Cleaning

- Stewarding and security
- Facilities management
- Hotel management

16.103. Manchester City Football Club has also committed to providing a range of employment, skills and training initiatives to maximise the accessibility of employment opportunities to local residents within the City. As part of the Proposed Development, plans for a 'Service Sector Training and Skills Academy' are actively being explored, working in partnership with Manchester City Council and a proven education provider.

16.104. At present, formal education routes available for people who aspire to build a career in the hospitality sector, particularly those which offer real life practical experience as part of gaining qualifications, are low in number. Manchester City Football Club's plans would ensure that the hospitality sector expertise required to manage the new entertainment destination at the Campus would be drawn from local neighbourhoods, and Manchester City Football Club would support the development of skilled and qualified local people, who would be empowered to create an exceptional fan and visitor experience at the Etihad Campus, adopting hospitality as a career of choice. By offering distinctive learning and training opportunities connected to Manchester City Football Club and City Football Group, there is a huge opportunity to encourage and inspire people of all ages.

16.105. Considering the above, it is assessed that there will be a **moderate beneficial**, long-term, permanent social value effect within Manchester, and a **minor beneficial**, long-term, permanent effect at the regional and national level during the operational phase

Deprivation and Regeneration

16.106. The Proposed Development has the potential to positively influence a number of deprivation indices. In particular, the Proposed Development will have a positive impact on income and employment deprivation through the generation of approximately 602 direct jobs on site.

16.107. The Site forms part of the Etihad Stadium and land to the north and currently does not maximise its potential. Building on the significant progress to date and that to be realised through the completion of Co-op Live, the Proposed Development enhances the Etihad Campus' reputation as a sports and leisure visitor destination of national significance, providing supplementary commercial, retail, and hotel offerings that will act as a catalyst for the expansion of a year-round world-class sports and entertainment destination.

16.108. It presents a unique case of uses at the Etihad Campus that are entirely distinctive in their offering and which are essential for the success of the Etihad Campus and East Manchester. The Proposed Development will significantly improve the fan experience and, in creating a destination that appeals to a broad audience on both match and non-match days, it will enliven the Etihad Campus all-year round, ensuring that the Etihad Campus is animated throughout the day and night-time.

16.109. It therefore delivers on the vision for the Etihad Campus as set out within UDP Saved Policy EM11 and Core Strategy Policy EC7.

16.110. The Proposed Development will significantly increase the number of people visiting the area (approximately 1.93 million per year). In doing so it contributes to strengthening East Manchester's role as a visitor destination within the City, as well as delivering associated improvements in crime and safety.

16.111. Based on the above assessment it is concluded that the Proposed Development is likely to have a **major beneficial**, long term, permanent effect on deprivation and regeneration objectives at the local level.

Climate Change and Adaptation

16.112. There are not anticipated to be any discernible effects on socio-economics arising from climate change during the operational phase of the Proposed Development.

Summary

16.113. Table 16.5 below provides a summary of the identified socio-economic effects during operation of the Proposed Development.

Table 16.5: Summary of socio-economic effects during operation.

| Receptor | Sensitivity | Description of Effect | Magnitude of Change / Impact | Effect Significance |
|---|---|---|---|---|
| **Local Employment** | Low | Generation of 602 FTE on-site operational jobs once complete and occupied.<br><br>Supporting an estimated 5,975 full time equivalent jobs through on-site employment, employment created through off-site visitor expenditure, indirect supply chain employment and induced employment through household expenditure. | High | **Moderate beneficial, permanent** |
| **Local Businesses** | Moderate | Attraction of approximately 1.93 million visitors a year will generate approximately £35.8m of off-site visitor expenditure each year. | High | **Moderate beneficial, permanent** |
| **Local Residents and Local Businesses** | Moderate / High | The Proposed Development will provide year-round activity to the Etihad Stadium.<br><br>Improvements to regeneration objectives and several domains of deprivation including income and employment. | High | **Moderate beneficial, permanent** |

| Receptor | Sensitivity | Description of Effect | Magnitude of Change / Impact | Effect Significance |
|---|---|---|---|---|
| Greater Manchester GVA | High | Adding £71.7 million of net additional GVA per annum into the Greater Manchester economy. | High | Minor beneficial |

## Mitigation Measures

Mitigation and Monitoring during Construction

16.114. There are no adverse socio-economic effects assessed for the construction phase of the Proposed Development and therefore no additional mitigation measures have been identified.

### Mitigation and Monitoring Once the Proposed Development is Complete and Occupied

16.115. As set out in the Social Value Statement, Manchester City Football Club is committed to delivering social value to local communities, and for those who live and work in the area to benefit from having a sports, leisure and entertainment destination of national significance nearby. This includes a commitment to ensuring as many jobs as possible go to local people and strategies which support the hiring of people who live within walking distance. Manchester City Football Club has also committed to providing a range of employment, skills and training initiatives to maximise the accessibility of employment opportunities to local residents within the City. As part of the Proposed Development, plans for a 'Service Sector Training and Skills Academy' are being actively explored, working in partnership with Manchester City Council and a proven education provider.

16.116. There are no adverse socio-economic effects assessed for the occupied and operational phase of the Proposed Development and therefore no additional mitigation measures have been identified.

## Cumulative Effects

16.117. This section assesses the socio-economic effects of the Proposed Development in combination with the potential socio-economic effects of other committed developments, as contained within the Scoping Report at Appendix 2.1.

16.118. A number of Sites within a 1km radius of the Site benefit from extant Planning Permission, or are currently under consideration by the Local Planning Authority. There are no committed developments within 500m of the Site.

### Construction

16.119. There no cumulative effects in relation to construction within this radius. Co-op Live has been considered as part of the baseline assessment. Since construction employment is relatively mobile, it is not considered appropriate to assess the potential employment effects of the construction stage at the local level.

16.120. There will of course be wider cumulative effects when considering schemes outside of the 500m radius and across Greater Manchester as a whole, however these cumulative effects cannot be readily quantified on the basis of the information available for each development. The likely residual cumulative effects in relation to construction employment and associated local spending would likely be **moderate beneficial** in the context of the overall Manchester construction workforce.

## Operational Phase

16.121. There are no committed developments within 500m of the Site and therefore no cumulative effects in relation to operation within this radius. Co-op Live has been considered as part of the baseline assessment.

## Residual Effects

16.122. This section identifies the residual socio-economic effects, following the implementation of mitigation and monitoring measures, known as 'residual effects' which cannot be eliminated through design changes or the application of standard mitigation measures.

16.123. The Proposed Development will have an overall beneficial effect on the local economy, increasing economic activity through the provision of an expanded capacity of the Etihad Stadium and provision of other unique uses that are entirely distinctive in their offering and which are essential for the success of the Etihad Campus and East Manchester. The Proposed Development will significantly improve the fan experience and, in creating a destination that appeals to a broad audience on both match and non-match days, it will enliven the Etihad Campus all-year round.

16.124. The Proposed Development will also have positive effects on the regeneration objectives within the Development plan, as set out within UDP Saved Policy EM11 and Core Strategy Policy EC7, supporting MCC's ambitions to create a year-round world-class sports and entertainment destination at the Etihad Campus, in line with policy objectives.

16.125. Table 16.6 below summarises the residual socio-economic effects of the Proposed Development during construction and operation.

Table 16.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **Manchester in Workforce** | 3,347 FTE direct, indirect and induced temporary jobs created during the construction phases within Manchester | N/A | **Moderate beneficial (temporary)** |
| **Greater Manchester Workforce** | 3,910 FTE direct, indirect and induced temporary jobs created during the construction phases within Greater Manchester | N/A | **Moderate beneficial (temporary)** |
| **Net additional GVA in Manchester** | £84,596,862 net additional GVA in Manchester | N/A | **Moderate beneficial (temporary)** |
| **Net additional GVA in Greater Manchester** | £191,117,669 net additional GVA in Greater Manchester | N/A | **Moderate beneficial (temporary)** |
| **Operational** | | | |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Local Employment | Generation of an additional 2,925 net operational jobs (including full time, part time and casual) once complete and occupied | N/A | Moderate beneficial, permanent |
| Local Employment | Generation of 600 FTE on-site operational jobs once complete and occupied<br><br>Supporting an estimated 5,975 full time equivalent jobs through on-site employment, employment created through off-site visitor expenditure, indirect supply chain employment and induced employment through household expenditure. | N/A | Moderate beneficial, permanent |
| Local Businesses | Attraction of approximately 1.93 million visitors a year will generate approximately £35.8m of off-site visitor expenditure each year. | N/A | Moderate beneficial, permanent |
| Local Residents and Local Businesses | The Proposed Development will provide year-round activity to the Etihad Stadium.<br><br>Improvements to regeneration objectives and several domains of deprivation including income and employment. | N/A | Moderate beneficial, permanent |
| Greater Manchester GVA | Adding £71.7 million of net additional GVA per annum into the Greater Manchester economy. | N/A | Minor beneficial |

## Future Monitoring of Significant Residual Environmental Effects

16.126. There are no significant residual socio-economic effects which will require future monitoring.

## Reference List

16.127. This ES Chapter has been prepared by reference to the following:

- Appendix 16.1: North Stand Development: Economic Impact Assessment (April 2023), prepared by Amion.

# 17. Summary of Residual Effects

17.1 This section contains a summary of the residual effects of the Proposed Development.

## Air Quality

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **Receptors sensitive to construction dust impacts** | Medium risk of impacts from dust and emissions during construction, leading to potential disamenity/nuisance | Mitigation measures proposed in line with good practice to ensure dust and emissions during construction are minimised | With effective implementation of recommended mitigation the residual effect is likely to be not significant |
| **Operation** | | | |
| **Air quality sensitive receptors** | No significant effects predicted | No mitigation measures required | Not significant |

## Climate Change

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **The global atmosphere** | Major adverse | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business as usual baseline. The business as usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the Proposed Development, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Moderate adverse. Effects are long term. |
| | | Explore the possibility of using cement replacement where possible to reduce embodied carbon. | |
| | | Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.) | |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | | Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials. | |
| | | Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.) | |
| | | Review opportunities to reduce the number and distance of construction transport trips. | |
| | | Review opportunities to reduce energy association with construction installation processes. | |
| | | Review opportunities for modular off-site construction techniques, to consolidate delivery requirements, for energy efficient assembly and minimising site installation process. | |
| | | Maximise recycled content in the steelwork. | |
| | | Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds / covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead. | |
| | | Implement a travel plan for site staff. | |
| | | Temporary electrical supply connection to minimise the use of on-site diesel generators. | |
| | | Site energy monitoring and improvement programme. | |
| | | Using less or alternative material and design to maximise useful lifetime. Embodied carbon impact to be assessed and reviewed post-planning during the design development to ensure that the carbon impact is further reduced where feasible. | |
| Operational | | | |
| **The global atmosphere.** | Major adverse | Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan). | Moderate adverse. Effects are long term. |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Embodied carbon associated with the in-use stage for the Proposed Development (lifecycle stage B1-B5) | | Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings). | |
| The global atmosphere.<br>GHG emissions associated with operational energy for the Proposed Development (lifecycle stage B6) | Minor adverse | Explore the use of passive design measures in order to reduce the need for heating<br>Where any electrical equipment is being installed, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment. | Minor adverse. Effects are long term. |
| The global atmosphere.<br>GHG emissions associated with operational water consumption (lifecycle stage B7) | Moderate adverse | Specify the use of water meters to measure water consumption. | Moderate adverse. Effects are long term. |
| The global atmosphere.<br>GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4). | Major adverse | Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the Proposed Development using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the Proposed Development, taking into consideration industry benchmarks set by LETI and RIBA, and 10% reduction secured through further design refinement. | Moderate adverse. Effects are long term. |

## Flood Risk and Drainage

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| **Construction** | | | |
| **River Medlock: water quality** | Increased sediment load; Hydrocarbon and oils; Accidental leak of and use of hazardous materials; Leak or breakage of the temporary; and sewerage system. | Measures implemented through a CMP | Negligible |
| **Ashton Canal: water quality** | Increased sediment loads; Hydrocarbon and oils; Accidental release of hazardous materials; Dust and debris; and Leak or breakage of the temporary sewerage system. | Measures implemented through a CMP | Negligible |
| **Water supply** | Increased water demand | N/A | Minor adverse |
| **Surface water drainage capacity** | Dewatering of excavations | Measures implemented through a CMP | Negligible |
| **Site users: Human health and safety, construction workers and plant** | Flood risks to site workers (surface water and fluvial from River Avon) | Measures implemented through a CMP | Negligible |
| **Operational** | | | |
| **River Medlock; Water quality** | Pollutants contained in surface water | N/A | Negligible |
| **Ashton Canal; Water quality** | Pollutants contained in surface water | N/A | Negligible |
| **Water supply** | Potable water demand: Increased | • Early engagement with UU on the potable water needs for the Proposed Development, and any current restrictions and the need for any upgrades.<br>• Water efficiency measures that will reduce potable demand and subsequent foul flows<br>The advantage of demand management is not only for reducing supply, but also for minimising the volume of the foul drainage | Minor Adverse |
| **Foul drainage capacity** | Foul water drainage: Increased | | Minor adverse |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | | element to the combined sewer. | |
| Site users: Human health and safety | Changes to flood risk: Flood risk to humans/uses vulnerable to flood risk | N/A | Negligible |

## Ground Conditions

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| Construction workers | Direct contact (direct and indirect) of contaminated ground. | Implementation of appropriate health, safety and hygiene regime (to include PPE and welfare provisions). Implementation of good construction practice. All detailed in the CoCP and CMP. | Negligible |
| Off-site users/visitors | Inhalation of contaminated dusts | Implementation of good construction practice (dust suppression). All detailed in the CoCP, and CMP. | Negligible |
| Operational | | | |
| Future site users/visitors | Direct contact / ingestion of contaminated soils | Majority of site is hardstanding, with limited areas of soft landscaping. Proposed landscaping is likely to be effectively isolated from existing Made Ground materials (horticultural requirements) or located within above ground planters with appropriate imported topsoil. | Negligible |
| Built environment | Permeation of water supply pipes and aggressive attack on below ground concrete structures | Implementation of appropriate concrete design class during construction (as defined within the foundation design).<br>Implementation of appropriate barrier pipe materials during construction where pipework is placed directly in Made Ground. | Negligible |

## Human Health

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Economic – jobs & training | Moderate Beneficial | None required | Moderate Beneficial |
| Climate Change – Global Atmosphere | Major Adverse | Reduce embodied carbon, re-use materials, energy & transport efficiencies | Moderate Adverse |
| Air Quality - dust | Medium-Low | CEMP | Not Significant |
| Water & Flood Risk – river/canal quality | Negligible | CEMP | Negligible |
| Water & Flood Risk – supply & drainage | Minor Adverse/Negligible | N/A & CEMP | Minor Adverse/ Negligible |
| Water & Flood Risk – flood risk – workers on site | Negligible | CEMP | Negligible |
| Ground Conditions - Workers & off-site users/visitors | Negligible | CEMP | Negligible |
| Noise & Vibration | None | None required | Negligible |
| Townscape & Visual - Residents & visitors | Minor- Moderate Adverse | CEMP | Minor- Moderate Adverse |
| Traffic & Transport | Traffic increase | CEMP | Not Significant |
| External Lighting – residents & drivers | Negligible | CEMP, design | Negligible |
| Operational | | | |
| Economic – jobs & training | Moderate Beneficial | None required | Moderate Beneficial |
| Crime – users, visitors & residents | Moderate Beneficial | None required | Moderate Beneficial |
| Open Space, Recreation & Amenity - Users, visitors & residents | Moderate Beneficial | None required | Moderate Beneficial |
| Sunlight – workers & users amenity open spaces | Negligible | None required | Negligible |
| Waste Management – workers, visitors, residents | Moderate Beneficial | None required | Moderate Beneficial |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Air Quality | None Significant | None Required | Not Significant |
| Climate Change – Global Atmosphere Embodied Carbon | Major Adverse | Reduce embodied carbon, extend longevity of material, minimise use | Moderate Adverse |
| Climate Change – Global Atmosphere GHG energy | Minor Adverse | Explore passive design for hearting, energy efficiencies | Minor Adverse, Not Significant |
| Climate Change – Global Atmosphere GHG water | Moderate Adverse | Measure water consumption | Moderate Adverse |
| Climate Change – Global Atmosphere GHG end of life | Major Adverse | Reduce lifecycle embodied carbon | Moderate Adverse |
| Water & Flood Risk – water quality | Pollutants – Negligible | None required | Negligible |
| Water & Flood Risk – demand & drainage | Capacities – Minor Adverse | Water efficiencies | Minor Adverse, Not Significant |
| Water & Flood Risk – flood risk to users | Flood risk – Negligible | None required | Negligible |
| Ground Conditions- Site users/visitors | Negligible | None required | Negligible |
| Noise – match, concert, fan zone, traffic, building plant - Residents nearby | Negligible/Not Significant Minor/Moderate Beneficial to the north from matches & events Major Beneficial from fan zone for all receptors | None required | Negligible/Not Significant Minor/Moderate Beneficial to the north from matches & events Major Beneficial from fan zone for all receptors |
| Townscape & Visual - Users, visitors & Residents | Minor – Moderate Beneficial | None required | Minor – Moderate Beneficial |
| Traffic & Transport - Residents & visitors | Negligible | None required | Negligible |
| Wind Microclimate – workers & visitors | Minor Adverse ( one small area) – Negligible | None required | Minor Adverse (one small area) – Negligible |
| External Lighting – residents & drivers | Negligible | Design & Lighting Controls | Negligible |

## Noise and Vibration

17.2 No significant or otherwise adverse residual effects are expected from either construction noise and vibration, or operational noise associated with the Proposed Development at any receptor.

17.3 The Proposed Development is predicted to result in significant beneficial residual effects due to the reduction of event noise from use of the fan zone at the north of the stadium and from concerts. In both cases, this is due to the increased screening from the new structures to be constructed.

## Townscape and Visual Impact

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| Heritage Designations | Indirect effect/local extent of effect. (Any visual relationships with between heritage assets and the site will be assessed within the visual assessment) | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |
| Townscape Character | Direct effect/city-wide extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Urban Grain | Direct effect/local extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Land Use | Direct effect/local extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Building Heights | Direct effect/city-wide extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Movement & Linkages | Direct effect/site extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |
| Site Character | Direct effect/site extent of effect. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have moderate significance. |
| Viewpoint 1: View north west from pedestrian footbridge leading to Commonwealth Way, Etihad Stadium. | Views of construction activities adjacent to Stadium. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Viewpoint 2: View south west from footpath entrance to canal and Alan Turing Way – adjacent to Listed Lock Keepers Cottage. | Views of construction works beyond the treeline. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 3: View from Joe Mercer Way looking south to stadium North Stand. | Open views of construction works to the Stadium. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have moderate significance. |
| Viewpoint 4: View looking south east towards stadium on CityLink pedestrian and cycle link from Piccadilly Station. | Partial views of construction works. Above existing buildings. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 5: View from footway of A662 Ashton New Road looking north east to Site. | Partial views of construction works beyond stadium. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 6: View from footway of Grey Mare Lane and residential area to the south. | Views of construction works will be partially visible in distance. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |
| Viewpoint 7: View from Velopark foot/ cycle bridge looking east towards site. | Partial views of construction works beyond stadium. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Viewpoint 8: View from pathway with Philips Park looking east towards site. | Partial views of construction works beyond existing buildings and trees. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have moderate significance. |
| Viewpoint 9: View south towards site from pedestrian crossing on Alan Turing Way A6010, at junction with Brisco Lane. | Minor, glimpsed views of construction works. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to be not significant. |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Viewpoint 10: View from pathway in Saxon Saint Park looking south east towards site. | Partial views of construction works on skyline. | CEMP proposals | Indirect, temporary, short-term adverse effect which is considered to have minor significance. |
| Operational | | | |
| Heritage Designations | Indirect. (Any visual relationships between heritage assets and the site will be assessed within the visual assessment) | | Long-term beneficial effect which is considered to be not significant. |
| Townscape Character | Direct effect/city-wide extent of effect. | | Long-term, beneficial effect which is considered to be moderately significant. |
| Urban Grain | Direct effect/local extent of effect. | | Long-term, beneficial effect which is considered to be moderately significant. |
| Land Use | Direct effect/local extent of effect. | | Long-term, beneficial effect which is considered to be moderately significant. |
| Building Heights | Direct effect/city-wide extent of effect. | | Long-term, beneficial effect which is considered to be moderately significant. |
| Movement & Linkages | Direct effect/local extent of effect. | | Long-term, beneficial effect which is considered to be of minor significance. |
| Site Character | Direct effect/site extent of effect. | | Long-term, beneficial effect which is considered to be moderately significant. |
| Viewpoint 1: View north west from pedestrian footbridge leading to Commonwealth Way, Etihad Stadium. | Clear change in the view. Open view of the Proposed Development in conjunction with the Stadium. | | Long-term, beneficial effect which is considered to be of minor significance. |
| Viewpoint 2: View south west from footpath entrance to canal and Alan Turing Way – adjacent to Listed Lock Keepers Cottage. | Clear change in the view. Stadium will appear above existing treeline. | | Long-term, beneficial effect which is considered to be of minor significance. |
| Viewpoint 3: View from Joe Mercer Way looking south to stadium North Stand. | The Proposed Development will be a new dominant building across the view, on | | Long-term, beneficial effect which is considered to be moderately significant. |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| | what is a key approach route. | | |
| **Viewpoint 4: View looking south east towards stadium on CityLink pedestrian and cycle link from Piccadilly Station.** | Clear change in the view with new taller built form. Screening provided by existing built form and tree cover. | | Long-term, beneficial effect which is considered to be of minor significance. |
| **Viewpoint 5: View from footway of A662 Ashton New Road looking north east to Site.** | Partial change to view - additional Stadium element visible in background. | | Long-term, beneficial effect which is considered to be of minor significance. |
| **Viewpoint 6: View from footway of Grey Mare Lane and residential area to the south.** | Minor glimpsed view of new buildings beyond the main Stadium. | | Long-term, irreversible, not applicable effect which is considered to be not significant. |
| **Viewpoint 7: View from Velopark foot/ cycle bridge looking east towards site.** | Partial change to view - additional Stadium element visible in background. | | Long-term, beneficial effect which is considered to be of minor significance. |
| **Viewpoint 8: View from pathway with Philips Park looking east towards site.** | Partial change to view - additional Stadium element visible in background. | | Long-term, beneficial effect which is considered to be moderately significant. |
| **Viewpoint 9: View south towards site from pedestrian crossing on Alan Turing Way A6010, at junction with Brisco Lane.** | Minor, glimpsed views of new Stadium buildings. | | Long-term, irreversible, not beneficial effect which is considered to be not significant. |
| **Viewpoint 10: View from pathway in Saxon Saint Park looking south east towards site.** | Change in the character of the view. New Stadium structure will be clearly visible on the skyline. | | Long-term, beneficial effect which is considered to be of minor significance. |

## Traffic and Transport

| Likely Significant Effects | Receptor(s) | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction Phase | | | |
| **Highway Links** | Negligible | Construction and Environmental Management Plan (CEMP) | Negligible |

| Operational Phase | | | |
|---|---|---|---|
| **Highway Links** | Negligible | Framework Travel Plan | Negligible |

## Wind Microclimate

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction | | | |
| | Negligible | None required | Negligible |
| Operational | | | |
| **Pedestrians walking around the south area of the stadium** | Minor adverse | Small marginal safety area<br>None required | Minor adverse |
| **Pedestrians walking around the hotel underpass and proposed buildings** | Negligible | None required | Negligible |
| **Pedestrians walking around the area underneath the canopy** | Negligible | None required | Negligible |
| **Pedestrians walking at the north concourse ground areas** | Negligible | None required | Negligible |
| **Pedestrians walking at the east concourse areas** | Negligible | None required | Negligible |
| **Pedestrians walking at the west concourse areas** | Negligible | None required | Negligible |
| **Pedestrians using the terraces** | Negligible | None required | Negligible |

## Lighting

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Means of Implementation | Residual Effects |
|---|---|---|---|---|
| Construction | | | | |
| **R1 – Ashton Canal / Ecology** | Negligible | None | Design | None |
| **R2 – Philips Park / Ecology** | Negligible | None | Design | None |

| Receptor(s) | Likely Significant Effects | Mitigation Measures | Means of Implementation | Residual Effects |
|---|---|---|---|---|
| R3 – Alan Turing Way – Low Level / Residential Properties | Negligible | None | Design | None |
| R3A – Alan Turing Way – High Level / Residential Properties | Negligible | None | Design | None |
| R4 – Bradford Road – Low Level / Residential Properties | Negligible | None | Design | None |
| R4A – Bradford Road – High Level / Residential Properties | Negligible | None | Design | None |
| R5 – Alan Turing Way / Motorised Traffic | Negligible | None | Design | None |
| Operational | | | | |
| R1 – Ashton Canal / Ecology | Minor Adverse? | Lighting Control System | Design + Lighting Controls | None |
| R2 – Philips Park / Ecology | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R3 – Alan Turing Way – Low Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R3A – Alan Turing Way – High Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R4 – Bradford Road – Low Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R4A – Bradford Road – High Level / Residential Properties | Negligible | Lighting Control System | Design + Lighting Controls | None |
| R5 – Alan Turing Way / Motorised Traffic | Negligible | Lighting Control System | Design + Lighting Controls | None |

## Socio-Economic

| Likely Significant Effects | Receptor(s) | Mitigation Measures | Residual Effects |
|---|---|---|---|
| Construction Phase | | | |

| | | | |
|---|---|---|---|
| Manchester in Workforce | 3,347 FTE direct, indirect and induced temporary jobs created during the construction phases within Manchester | N/A | **Moderate beneficial (temporary)** |
| Greater Manchester Workforce | 3,910 FTE direct, indirect and induced temporary jobs created during the construction phases within Greater Manchester | N/A | **Moderate beneficial (temporary)** |
| Net additional GVA in Manchester | £84,596,862 net additional GVA in Manchester | N/A | **Moderate beneficial (temporary)** |
| Net additional GVA in Greater Manchester | £191,117,669 net additional GVA in Greater Manchester | N/A | **Moderate beneficial (temporary)** |
| **Operational Phase** | | | |
| Local Employment | Generation of an additional 2,925 net operational jobs (including full time, part time and casual) once complete and occupied | N/A | **Moderate beneficial, permanent** |
| Local Employment | Generation of 600 FTE on-site operational jobs once complete and occupied<br><br>Supporting an estimated 5,975 full time equivalent jobs through on-site employment, employment created through off-site visitor expenditure, indirect supply chain employment and induced employment through household expenditure. | N/A | **Moderate beneficial, permanent** |
| Local Businesses | Attraction of approximately 1.93 million visitors a year will generate approximately £35.8m of off-site visitor expenditure each year. | N/A | **Moderate beneficial, permanent** |
| Local Residents and Local Businesses | The Proposed Development will provide year-round activity to the Etihad Stadium.<br><br>Improvements to regeneration objectives and several domains of deprivation including income and employment. | N/A | **Moderate beneficial, permanent** |
| Greater Manchester GVA | Adding £71.7 million of net additional GVA per annum into the Greater Manchester economy. | N/A | **Minor beneficial** |

# 18. Type 1 Cumulative Effects

## Introduction

18.1. This section gives consideration to "Type 1" cumulative effects.

18.2. The assessment is informed by the results of the technical assessments as set out in Chapters 6-16 of the ES.

18.3. Type 1 cumulative effects are also known as 'intra-project' effects, which are the combined effects arising from the Proposed Development upon a set of defined sensitive receptors. An example would be where a local resident is affected by dust, noise and a loss of visual amenity during the construction of a scheme, with the result being a greater nuisance than each individual effect alone.

18.4. Type 2 cumulative effects are considered within the ES technical Chapters. The technical Chapters also had regard to the potential for Type 1 cumulative effects, however for robustness the results of a standalone assessment of these is provided below.

## Legislation, Policy and Guidance

### Legislation

18.5. There is no legislation outlining how cumulative effects should be assessed or determined as significant. However, there is a requirement in Part 1, Schedule 4 of the EIA Regulations to consider cumulative effects. Cumulative is not defined in the EIA Directive or Regulations however a dictionary definition is 'increasing by one addition after another'.

18.6. The EIA Regulations require 'a description of the likely significant effects', including cumulative effects.

18.7. In the context of this assessment, 'cumulative effects' refers to the interactions between different likely residual effects resulting from the Proposed Development (Type 1). Both positive and negative effects are considered across the construction and operational phases.

### Policy

18.8. As this Chapter considers the cumulative effects of the technical areas within the ES, all relevant policy has already been reviewed within the individual technical Chapters.

### Guidance

18.9. A number of guidance documents which relate to assessing cumulative effects have been used to inform the assessment and include:

- European Commission (EC) Environment DG (May 1999), 'Study on the Assessment of Indirect and Cumulative Impacts as well as Impact Interaction', Hyder Consulting; and
- Institute of Environmental Management and Assessment (1992), Guidelines for the Environmental Assessment of Road Traffic.

18.10. The EC guidelines 'are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project'.

18.11. Paragraph 24 of the National Planning Practice Guidance (NPPG) (Reference ID: 4-024-20170728) outlines the consideration to be given to cumulative effects in the context of EIA:

"Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a Proposed Development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development."

## Assessment Methodology and Significance Criteria

### Methodology

18.12. This assessment is primarily concerned with where there is a likelihood of significant Type 1 cumulative effects occurring, in accordance with EIA practice and the NPPG guidance.

18.13. The assessment is based on experience and professional judgement, drawing upon relevant guidance set out above and the residual environmental effects identified within the results of the EIA technical assessments. The assessment has been undertaken by suitably qualified and experienced EIA practitioners.

18.14. The assessment has primarily focused on sensitive receptors identified within close proximity to the Site (e.g., local residents and businesses located in close proximity to the Site), likely cumulative effects, and their capacity to accommodate changes that will occur as a result of the combined residual environmental effects.

18.15. Relevant guidance has been reviewed, and an approach has been developed which uses the residual environmental effects identified within the ES. An exercise which tabulates the residual effects against receptors or receptor groups has then been carried out in order to identify the potential for Type 1 cumulative effects.

18.16. Negligible or neutral residual effects have been excluded from the assessment as, by their nature, they are considered to be imperceptible. Therefore, only minor, moderate or major effects have been given consideration during the assessment.

18.17. For the purposes of the assessment, receptor groups have been identified as those surrounding the Site and those identified within the individual technical assessments.

### Significance Criteria

18.18. The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have a very significant effect (either positive or negative) cumulatively;
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either positive or negative) cumulatively;
- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) cumulatively; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development cumulatively.

18.19. The significance level attributed to each effect has been assessed based on the magnitude of change due to the combination of residual effects and the sensitivity of the affected receptor/receiving environment to change, as outlined in Chapter 2 of the ES. Magnitude of change is assessed on a scale of major, moderate, minor and negligible and the sensitivity of the affected receptor/receiving environment is assessed on a scale of high, medium, low and negligible.

## Limitations and Assumptions

18.20. Due to the reliance on qualitative data and subjective opinion, there are limitations related to the range and depth in which the cumulative effects have been investigated. It must be realised that analysing the cumulative effects of developments is often speculative and cannot be predicted as clearly as individual effects such as the effects upon traffic of a development, which relies heavily upon quantitative data to inform the assessment. As a result, a number of assumptions have been made throughout in terms of the outcome of the accumulation of effects and based upon professional judgement. This section and the assessment process of identifying the likely significant Type 1 cumulative effects have, however, provided a reasoned consideration of and insight into the potentially significant Type 1 cumulative effects of the Proposed Development.

## Identification of Likely Significant Type 1 Cumulative Effects

18.21. Based on the methodology detailed above, Table 18.1 presents the results of the review of the potential for interactions of individual effects during the construction phase of development. The potential effect interactions are then discussed further.

18.22. To ensure a robust approach; the type 1 cumulative effects for each chapter have also been considered in relation to the technical studies submitted with the application which were scoped out of the ES, as confirmed by the EIA Scoping exercise.

### Construction Phase

| Sensitive Receptor Group | Construcution Phase Residual Effects (after mitigation) | Likely Signifcant Cumlative Effects |
|---|---|---|
| **Existing residents, fans and visitors** | Greenhouse Gas Emissions: temporary moderate adverse<br>Water Resources:<br>Minor adverse due to increased water supply demand<br>Townscape and Visual Impact: Temporary minor adverse<br>Human Health<br>Minor-moderate adverse | No likely significant Type 1 cumulative effects. |
| **Employment/Training and GVA** | Human Health:<br>Moderate beneficial<br>Socio-Economic:<br>Moderate beneficial | No likely significant Type 1 cumulative effects. |
| **Construction Workers** | Greenhouse Gas Emissions: temporary moderate adverse | No likely significant Type 1 cumulative effects. |

Table 18:1: Construction Phase Type 1 Cumulative Effects

18.23. The table above illustrates there are no Type 1 potential cumulative effects.

### Operational Phase

18.24. Based on the methodology detailed above, Table 18:2 presents the results of the review of the potential for interactions of individual effects during the operational phase of development. The potential effect interactions are then discussed further.

| Sensitive Receptor Group | Operational Phase Residual Effects (after mitigation) | Likely Signifcant Cumlative Effects |
|---|---|---|
| **Existing residents, fans and visitors** | Greenhouse Gas Emissions: moderate adverse<br>Water Resources:<br>Minor adverse due to increased water supply demand and icnreased foul drainage capacity<br>Townscape and Visual Impact: Moderate beneficial | No likely significant Type 1 cumulative effects. |

| Sensitive Receptor Group | Operational Phase Residual Effects (after mitigation) | Likely Signifcant Cumlative Effects |
|---|---|---|
| | Human Health<br>Minor-moderate beneficial<br>Wind<br>Minor adverse for pedestrains walking around the south area of the stadium | |
| Employment/Training and GVA | Human Health:<br>Moderate beneficial<br>Socio-Economic:<br>Moderate beneficial | No likely significant Type 1 cumulative effects. |
| Open Space and Recreation Facilities | Human Health:<br>Moderate beneficial<br>Socio-Economic:<br>Moderate beneficial | No likely significant Type 1 cumulative effects. |

Table 18.2: Operational Phase Type 1 Cumulative Effects

18.25. The table above illustrates there are no Type 1 potential cumulative effects.

## Mitigation Measures

18.26. There are no Type 1 potential cumulative effects; therefore, no mitigation measures are proposed.

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