



Environmental Statement – Volume 1

Former Boddingtons Brewery

December 2021

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Introduction

- 1.1. This Environmental Statement ('ES') accompanies an application for full planning permission for the proposed redevelopment of the former Boddingtons Brewery Site ('The Site').
- 1.2. The proposals are submitted on behalf of Latimer Development Ltd. (the 'Applicant') and relate to a residential-led development with ground floor commercial uses and a pocket park. The term "Proposed Development" used within this Report refers to all stages of construction and operation of the development.
- 1.3. The Site is bounded by the Travelodge and surface level carparking to the north, further surface level carparking to the east, the under-construction Manchester College to the south, and Bury New Road to the west in Manchester. It has been identified as a regeneration priority for a number of years and is specifically identified as such within the Great Ducie Street Strategic Regeneration Framework (SRF) (GDS – SRF) and the Former Boddingtons Brewery SRF (FBB – SRF).
- 1.4. The Planning Application seeks permission for the following description of development:
"Erection of two buildings to create a mixed use development comprising residential uses (Use Class C3) with commercial uses (Use Class E) provided at the ground floor level, together with a new courtyard pocket park, landscaping, cycle parking, accessible parking spaces, access arrangements, and other associated works"
- 1.5. The Proposed Development is outlined in detail at Chapter 4 of this ES and is hereafter referred to as the 'Proposed Development'.
- 1.6. The 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

- 1.7. 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.
- 1.8. 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, so as to identify if there are likely significant effects on the environment. The assessment compares the existing situation at the start of the work (baseline) with the situation during demolition (as relevant) and construction, and when the Proposed Development is operational.
- 1.9. 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 (EIA Regulation Schedule 3).
- 1.10. The Proposed Development is considered to fall under the category of 'urban development projects' (EIA Regulations Schedule 2, 10, (b)) where:
 - The development includes more than 1 hectare of urban development which is not a dwellinghouse development; or
 - The development includes more than 150 dwellings; or
 - The overall area of the development exceeds 5 hectares.
- 1.11. In accordance with the EIA Regulations, this ES sets out the following information:
 - A description of the development, including in particular:

(a) a description of the location of the development;

(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

(c) a description of the main characteristics of the operational phase of the development; and,

(d) an estimate, by type and quantity, of expected residues and emissions during the construction and operation phases.

- A description of the reasonable alternatives 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.
- A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.
- A description of the factors specified in regulation 4(2) likely to be significantly affected by the development.
- Where relevant, a description of the likely significant effects of the development on the environment resulting from, inter alia:
 - (a) the construction and existence of the development, including, where relevant, demolition works;
 - (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
 - (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
 - (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
 - (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
 - (f) 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; and,
 - (g) the technologies and the substances used.
- A description of the likely significant effects on the factors specified in regulation 4(2) that covers the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.
- A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

- A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis).
- A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.
- A non-technical summary of the information.
- A reference list detailing the sources used for the descriptions and assessments included.

Project Team

- 1.12. Deloitte has extensive experience and expertise in managing the EIA process and holds the IEMA EIA Quality Mark. Deloitte has managed the EIA process and the production of the ES for the Former Boddingtons Brewery and has received technical input from a range of suitably qualified and experienced technical consultees, together “the Consultants”.

Table 1.1 ES Project Team

Topic	Assessment carried out by	Qualifications
Town Planning, EIA Coordination	Deloitte LLP	RTPI, RICS, IEMA EIA Quality Mark
Architect	Assael	RIBA
Air Quality	Air Pollution Services	MEng (Hons), MEnvSc, MIAQM,
Climate Change	Atkins	BSc, BArch, MSC, PhD, Qualified, FCIWEM, C.Env., PIEMA
Daylight and Sunlight	GIA	BSc (Hons) MRICS
Human Health	Atkins	BSc, MSc, CEnv, C.WEM, FIEMA, MCIWEM, FCIWEM
Townscape and Visual Impact	Barton Wilmore	BSc CMLI, PIEMA
Wind Microclimate	GIA	MEng, PhD

Organisation of the Environmental Statement

- 1.13. This ES comprises 13 chapters and is supported by figures (located at the back of 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.
- 1.14. Figures have been referenced using the chapter numbers 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 constrained separately in Volume 2.

Important notice: This Environmental Statement has been prepared by Deloitte Real Estate, with technical input from the Consultants. Table 1.2 below sets out the parties responsible for the technical content within Chapters 5-11 of this ES. 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 Consultants’ Reports and the technical content within Chapters 5-11 of this ES.

Table 1.2 sets out the structure of the ES.

Table 1.2 ES Structure

Chapter No.	Chapter Title	Responsibility	Description
Volume 1			
1.	Introduction	Deloitte	Introduction to the ES, EIA requirements, details of the project team, ES organisation and availability.
2.	EIA Methodology	Deloitte	Methods used to prepare each chapter, description of ES structure and content, generic significance criteria, scoping and consultation.
3.	Alternatives and Design Evolution	Deloitte with input from Assael	Outline of the main alternatives considered by the Applicant.
4.	Site, Surroundings and Description of Development	Deloitte with input from Assael	Site description and details of the Proposed Development.
5.	Construction Management and Phasing	Bridgehead Consultancy with input from Latimer Developments Ltd	Details of anticipated programme for development and construction methodology are also included.
6.	Air Quality	Air Pollution Services Ltd.	Provide an assessment of existing air quality surrounding the Proposed Development in addition to the likely impacts on air quality during construction and subsequent operation.
7.	Climate Change	Atkins	Assessment of the Proposed Development and its potential impact in relation to climate change.
8.	Daylight and Sunlight	GIA	Assess the effects of the Proposed Development on sunlight and daylight on neighbouring properties.
9.	Human Health	Atkins	Assess the potential impact the Proposed Development may have on human health.
10.	Townscape and Visual Impact	Barton Wilmore	Potential impacts and likely effects of the Proposed Development on the townscape character and visual amenity of the site and the surrounding area.
11.	Wind Microclimate	GIA	Assess impacts on pedestrian comfort and safety as a consequence of wind effects.
12.	Residual Impacts	Based on conclusions of technical chapters	Summary of the effects that remain after mitigation.
13.	Type 1 Cumulative Impacts	Deloitte	Review of inter project effects, which are combined effects arising from the Proposed Development on defined sensitive receptors.
Volume 2 – Technical Appendices			
Volume 3 - Non-Technical Summary			

Other Documents

- 1.15. Together with the ES, the following documents in Table 1.3 will be submitted to Manchester City Council (MCC) as the Local Planning Authority (LPA) in support of the Planning Application.

Table 1: List of documents submitted in support of this Planning Application.

Document	Prepared By
Location Plan, Existing Site Plan and Elevations	Assael Architects
Planning Application Drawings	Assael Architects
Landscape Plans	Exterior Architecture
Statement of Consultation	Deloitte LLP
Design and Access Statement	Assael Architects
Affordable Housing Statement	Deloitte with input from Latimer Development Group
Archaeology Assessment	Salford Archeology
Broadband Connectivity Assessment	GTech
Crime Impact Statement	Greater Manchester Police
Ecological Appraisal	The Ecological Consultant
Energy Statement and Environmental Standards Statement	Wallace Whittle
Fire Strategy Report	Ofr Consultants
Flood Risk and Drainage Strategy	SGI Engineers
Ground Conditions Phase 1	prepared by e3p
Heritage Statement	Salford Arcaheology
Local Benefits Proposal – Statement of Intent	Latimer Development Ltd
Noise Report	Cundalls
Residential Management Strategy	Clarion Housing Group
Waste Management and Servicing Strategy	Curtins
Transport Assessment and Travel Plan	Curtins
TV Reception Survey	Gtech

Document	Prepared By
Commercial Strategy	Latimer Development Ltd
Ventilation Strategy	Wallace Wittle

Environmental Statement Availability

- 1.16. The ES is available for public viewing on MCC's Public Access website at the following address:
<http://pa.manchester.gov.uk/online-applications/> once the application has been submitted and validated.
- 1.17. The ES may be purchased in volumes, the costs of 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, 2 and 3) of the ES on CD - £15
- 1.18. For copies of any of the above, please contact the Manchester Planning Team at Deloitte:

Boddingtons Team – Planning and EIA
 Deloitte LLP
 The Hanover Building,
 Corporation Street
 Manchester
 M4 4AH

Environmental Impact Assessment 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.
- 2.2. It is accompanied by the following technical appendices:
 - Appendix 2.1 –Committed Developments
 - Appendix 2.2 – Scoping Exercise

Legislation and Guidance

- 2.3. 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.
- 2.4. 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.htm>
 - 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)
 - 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.
- 2.6. 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)
- 2.7. Any additional planning policy or guidance documents considered relevant have been identified within the relevant technical chapters.

Non-Significant Effects

- 2.8. As part of the process the EIA set out the following disciplines were found not to give rise to significant effects on the environment and would therefore not require inclusion in the ES. An explanation for this is found within Appendix 2.2 – ES Scoping Exercise. This was an informal exercise but the broad scope of the ES has been agreed with MCC.
- 2.9. As part of this scoping process the following topics have been scoped out:
- Agricultural Circumstances
 - Archaeology
 - Aviation
 - Built Heritage
 - Ecology
 - Electronic Interference
 - Ground Conditions
 - Noise
 - Socio-Economics
 - Television, FM Radio and DAB Radio Reception
 - Traffic and Transport
 - Water Resources

Approach to Technical Studies

- 2.10. Various technical studies were commenced at an early stage in the development process. The findings of the baseline environmental studies have played an important role in the design of the

Proposed Development by defining the environmental sensitivities, constraints and opportunities associated with the Site.

- 2.11. Design 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 design team was fully aware of the environmental constraints and opportunities and of the interactions between disciplines. Meetings were also held with MCC as the Local Planning and Highway Authority and Environmental Health Organisation.
- 2.12. The technical studies have been undertaken in accordance with current best practice. Specific guidance used is referenced within each of the respective assessment chapters.
- 2.13. The majority of assessments involved consultations with statutory and non-statutory bodies, desk-based research, site inspections and surveys, impact prediction and mitigation.
- 2.14. The assessment and conclusions of the ES are based on the description of the Proposed Development provided in Chapter 4.

Structure of Technical Chapters

- 2.15. Each technical chapter of the ES (Chapters 6 to 11) has been set out broadly in line with Table 2.1; any variation from this structure is explained within the chapter.

Table 2.1: Structure of ES Technical Chapters

Technical Chapter Structure	
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.
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.
Assumptions and Limitations	This section describes any assumptions and limitations which have been made that are relevant to the environmental disciplines.
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. The assessment of effect significance has been undertaken using appropriate national and international

Technical Chapter Structure	
	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. 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. There are two distinct types of cumulative effects: Type 1 - Cumulative effects are the interactions between effects of the Proposed Development on a single receptor. These are addressed in Chapter 16. 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. 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.

- 2.16. Chapter 5 provides information to allow the construction phase of the Proposed Development to be assessed by the disciplines set out in Chapters 6 to 11.

Assessment and Evaluation of Significant Effects

- 2.17. 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.

Magnitude

2.18. The methodology for determining the scale, or magnitude of effect as set out in Table 2.2.

Table 2.2: 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 predevelopment circumstances/situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Sensitivity

2.19. The sensitivity of a receptor is based upon the relative importance of the receptor using the scale in Table 2.3.

Table 2.3: 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

2.20. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. Table 2.4 below shows how magnitude and sensitivity interact to derive effect significance.

Table 2.3: 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 Adverse/Beneficial	Minor Adverse/Beneficial
Minor	Moderate-Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor-Negligible
Negligible	Negligible	Negligible	Negligible

- 2.21. 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'.
- 2.22. For the purposes of this ES, an effect will be considered to be 'significant' if it is classed as either 'moderate' or 'major'.

Baseline Conditions

- 2.23. 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 11) includes a clear description of what is assumed as the baseline against which the assessment is being made.
- 2.24. The baseline includes nearby schemes under construction and where relevant will include nearby committed developments, and therefore represent the 'worst case' scenario.
- 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. Detailed mitigation recommended during the construction phase will be set out in the Construction Environmental Management Plan (CEMP) 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 CEMP are set out in Chapter 5: Construction Methodology and Programme.
- 2.29. Mitigation to be implemented during the operational phase will be secured through approved documents, 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'.

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. These include:
- Approved but unimplemented projects;
 - Plans or projects for which an application has been made and which are under consideration by the consenting authorities; and,
 - Certain projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative effects.
- 2.33. A search of MCC's planning applications database and knowledge of the area has identified a number of schemes for which cumulative effects are considered likely.
- 2.34. Each technical chapter (Chapters 6-11) has assessed the potential for likely significant effects on the environment as a result of the above committed developments, together with the Proposed Development.
- 2.35. In addition, Chapter 12 assesses the Type 1 Cumulative effects.

Assumptions and Limitations

- 2.36. 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;
 - Baseline conditions have been established in 2021 from a variety of sources, including historical data, but due to the dynamic nature of certain aspects of the environment, conditions will change during the Proposed Development;
 - 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 and Phasing.
- Conditions will be attached to the Planning Permission that will control disturbance during the Proposed Development; and
- Necessary off-site services infrastructure for the Proposed Development will be provided by statutory undertakers.

Objectivity

- 2.37. The technical studies undertaken within 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.

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, taking into account the environmental effects.
- 3.2. The form of the Proposed Development has been influenced by a range of factors, including location, surrounding land use and input from MCC, Statutory and Non-Statutory Consultees and other stakeholders.
- 3.3. This chapter reviews the principal land use and siting options explored and the reasoning for the selection of the current design for the Proposed Development which forms the subject of assessment within the ES.
- 3.4. This chapter considers the following four options in the context of the existing Development Brief:
 - The 'do nothing' alternative where the Proposed Development is not progressed.
 - Alternative locations for the Proposed Development.
 - Alternative Uses for the Site.
 - Alternative Scale and Massing for the Proposed Development.

The 'do nothing' Alternative

- 3.5. The 'do nothing' scenario refers to the option of leaving the Site in its current state, as described below in Section 4.
- 3.6. The Site, as a former brewery, has a long history as a former employment use. This came to an end in the early 2000's when the brewery was demolished, and since this time the Site has been predominantly used as a surface level car park. This use as a surface level carpark does not make efficient use of the Site and fails to utilise the Site's location benefits within a highly strategic and sustainable location.
- 3.7. Bringing the Site back into a meaningful use which contributes to the economic growth of the City is a longstanding ambition of MCC, and has been identified in a series of regeneration frameworks. Furthermore, the current condition of the Site creates what can be considered as a 'gap site' between the Travel Lodge and the Manchester College. This has a negative effect on the surrounding townscape. Furthermore, due to the existing use of the Site as a car park, the Site is an area which receives little activity and can therefore be susceptible to crime due to its reduced natural surveillance, particularly in the evenings. The Site currently contains a very limited amount of vegetation and as a surface level car park is predominantly hardstanding, therefore it provides little in regards to biodiversity.
- 3.8. Therefore, given the Site's historic economic use and MCC's longstanding ambition for the Site, the 'do nothing' scenario has been discounted.

Consideration of Alternative Locations

- 3.9. The Site has been identified for regeneration for almost fifteen years, most recently within the Great Ducie Street SRF and Former Boddingtons Brewery SRF. The surrounding area has seen major investment in recent years, particularly in the adjacent Green Quarter and Greengate areas,

and more recently in the NOMA, New Victoria and Victoria North. This has started to transform the northern edge of the City Centre and stimulate significant developer interest in the area.

- 3.10. The Site is in a highly accessible location, benefiting from excellent links to sustainable transport modes and all the amenities the City Centre has to offer, this alongside it being brownfield land, and ability to sustainably contribute to wider strategic aims are also key elements in its selection as a suitable location for a mixed-use development.
- 3.11. The proposals make effective use of brownfield land and the redevelopment of the Site is longstanding regeneration priority. Therefore, for the purposes of this planning application the consideration of alternative sites has been discounted.

Consideration of Alternative Uses for the Site

- 3.12. The Draft Places for Everyone document, which spans a plan period of 2021 to 2037, identifies that Manchester needs to deliver 3,533 new homes per annum in order to meet the population growth, with delivery of these homes being prioritized on previously developed (brownfield) land in order to reduce the need for residential development on greenfield land.
- 3.13. The City Centre has grown substantially in the past decade, including with the growth of the city centre residential market. The market has been supported by the redevelopment of city centre brownfield land for high-density residential uses. Given that there is a finite supply of brownfield land, there has been an increasing focus on the previously developed land on edge of the City Centre, such as in the northern edge in which the Site is located.
- 3.14. The SRF areas include large amounts of brownfield land in areas within easy access to the amenities and opportunities of the City Centre. Therefore the redevelopment of these areas for residential uses is attractive to developers, and the proximity of the location to the City Centre is attractive to future residents.
- 3.15. In addition, MCC's adopted town planning policies identify that there is a need to deliver new residential development in the City Centre to satisfy this demand. Given the very close proximity of the Site to the City Centre, it is considered that the proposals would support the City Centre housing market.
- 3.16. There is an important link between economic growth, regeneration and the provision of new residential development. As Manchester recovers from the impact of Covid-19 it will be important for developments to fuel and complement the economic recovery and growth of the City.
- 3.17. The Proposed Development will deliver 461 apartments in total, which will contribute towards Manchester's aspiration to increase City Centre residential development as a key part of their overall housing strategy, and 718 sq. m. of commercial space, further enhancing the economic growth of the City Centre Fringe. In addition, the tenure will include affordable housing which responds to the identified need for affordable housing in highly connected locations such as the City Centre, and with easy access to a thriving employment market.
- 3.18. For the reasons above, alternative uses were discounted.

Consideration of Alternative Scale and Massing

- 3.19. Different scales and massing options have been considered for the Proposed Development, the aim of which is to maximise the suitable use of the Site to create a viable scheme and minimise any negative impacts on adjacent land uses and the environment.
- 3.20. The area surrounding the Site has historically comprised primarily low-rise warehousing. However the ongoing regeneration of this part of the City includes areas of height including at New Victoria and on the adjacent development site, Old Brewery Gardens. These are creating an emerging context of larger scale buildings in the evolving vicinity of the Site. The SRFs have identified that

there is opportunity of height within the area, originally envisioned on the plot now occupied by Manchester College. As the College has come forward at a more modest scale consistent with an educational use there is an opportunity to revisit the location of areas of height within the SRF area and make an efficient use of brownfield land. This change in context is identified within the SRF addendum which states, *“there may be scope to deliver other development on the site between the College and the existing Travelodge and (proposed) Multi Storey Car Park on Francis Street. In that instance, there may be opportunities for delivery of a taller building on this site”*.

- 3.21. As such the massing and form of the Proposed Development has sought to complement these areas of higher density whilst also responding to the more human scale of Manchester College and surrounding areas.
- 3.22. A series of massing compositions were appraised through the design development of the scheme, and was informed by townscape analysis, identification of key views and microclimate assessments. The proposed massing has been designed to allow for a separation between the two buildings and provide more space to accommodate the pocket park. In order to deliver the quantum of publicly accessible landscaping there is a need for additional height to ensure a viable development is achieved and deliver the number of apartments required.
- 3.23. The final Proposed Development massing steps up from 11 storeys fronting Great Ducie Street and up to 27 storeys towards the Old Brewery Gardens development. Building A, which fronts Great Ducie Street has a simple form and includes a slight step-up away from the college up to 11 storeys. Building B steps from 17 storeys to 20 storeys and finally to 27 storeys. This varied massing of Building B adds further visual interest and complements the emerging skyline. Surrounding the pocket park is a one storey building which includes cycle stores and ancillary uses and has been designed to create a sense of enclosure and privacy to the park.
- 3.24. Overall the scale and massing will act as a dynamic element in the skyline and a marker for the regeneration and neighbourhood creation taking place in this location

Summary

- 3.25. 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. This process has been informed by the SRFs, viability, and the desire to create a positive relationship with the surrounding developments. The Proposed Development has been influenced by pre-application consultation with key stakeholders, as well as with MCC. On this basis, Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations has been considered.

Site and Development Description

- 4.1. This Chapter includes a description of the Site, its surrounding context, a more detailed description of the Proposed Development as well as the Site's suitability for the Proposed Development.

The Site

- 4.2. The Site is approximately 0.5 ha of brownfield land in the form of a surface car park. The Site comprises part of the former Boddingtons Brewery Site, as identified within the Great Ducie Street SRF and the Former Boddingtons Brewery SRF.
- 4.3. It is situated at the edge of Manchester City Centre, bounded by Travelodge and surface level carparking to the north, further surface level carparking to the east, the under-construction Manchester College to the south, and Bury New Road to the west in Manchester. It lies within Cheetham Ward. The Site is identified in the Manchester Local Development Framework ("LDF") Proposals Map (2012) as falling within the Regional Centre which it states is generally considered to be a location where higher density residential development is appropriate and will support the development of mixed use employment areas.
- 4.4. Historically, a brewery was located on the Site up until 2005. All the buildings associated with the brewery were demolished in 2007. Since this time, the former brewery has been used as a temporary surface car park comprising 852 spaces and the Site is currently occupied by approximately 192 of these parking spaces.
- 4.5. Although in physically poor condition, the Site is well placed to capitalise on its existing economic assets, connections and proximity to the City Centre. It is therefore considered there is a substantial amount of improvement that can be offered both on site and its immediate context through delivery of a high-quality scheme.
- 4.6. When the Core Strategy was published, it identified the Site as within the City Centre Fringe, but outside of the Strangeways Employment Area. Since this time the City Centre has grown to the extent that parts of the City Centre Fringe are much more akin to a City Centre, and which has occurred in areas near to the Site such as the Green Quarter and starting to occur on the Former Boddingtons Brewery SRF area. The increasing importance of the City Centre Fringe is acknowledged within the Core Strategy as inevitable due to its excellent connections and the increasing demand for homes, offices, and commercial space within the City Centre.

Planning History

- 4.7. There are no recent planning permissions of relevance on the Site. The planning history search only details a number of historic planning applications which renew the temporary car park use on site and in respect of the former brewery use.

Existing Site Context

- 4.8. The Site is located within an area that MCC has earmarked for regeneration, as outlined in the Great Ducie Street SRF and the Former Boddingtons Brewery Site SRF, as described in Chapter 2 of this Statement. The Site is adjacent to Great Ducie Street to the western boundary. Across Great Ducie Street are a number of warehouse buildings and beyond these is the River Irwell. Whilst not

in the city centre itself, the Site is only c. 100m from the city centre boundary and so benefits from access to all the amenities and employment market which that offers.

- 4.9. Bordering the Site to the north is a Travelodge and a surface level car park. Further north and to the west is a mixture of warehouses and industrial uses. HMP Manchester is located approximately 250m north of the Site on Southall Street. Beyond this, further north, lies the Manchester Fort Shopping Centre; a retail park with a range of occupiers.
- 4.10. Beyond the surface car parking to the east of the Site, is the Green Quarter; a residential-led, mixed-use development brought forward by Lend Lease comprising of high-rise apartment buildings, an office building, and a hotel. This long-established development includes a degree of open space at its heart and a small number of associated retail units.
- 4.11. Immediately to the south is another brownfield site, which was granted planning permission in 2019 for the erection of a five-storey educational building (18,495 sqm) (Use Class D1) with associated access, servicing, landscaping, public realm and other associated works following removal of existing car park (App Ref: 124995/FO/2019); this development will become the main campus of Manchester College. It is currently under construction and nearing completion, with students being welcomed from September 2022. Further south lies the AO Arena and Victoria Station as well as other commercial uses within the city centre.
- 4.12. To the west of the site across the River Irwell, lies the developing Greengate area in Salford. This has seen a number of large-scale residential developments in the past 5 years, including the 21-32 storey Greengate, Manchester which was completed January 2017, which comprised 497 units designed specifically for the PRS market; and the 44 storey Anaconda Cut, which comprises 349 apartments and was completed in 2018.

Emerging Context

- 4.13. The surrounding area has seen major investment in recent years, particularly in the adjacent Green Quarter and Greengate areas, and more recently in the NOMA, New Victoria and Victoria North. This has started to transform the northern edge of the City Centre and stimulate significant developer interest in the area. To date, the regeneration of the GDS-SRF and FBB-SRF areas has been slower than elsewhere in the northern edge of the City Centre but in recent years has started to accelerate.
- 4.14. The area to the east of the Site was granted planning permission in 2018 for redevelopment to provide 556 apartments and 3,490sqm of commercial space (App Ref: 118831/FO/2018). This was known as 'Old Brewery Gardens' at the time of its planning submission. Also designed by Assael, it features five brick-clad blocks ranging between 26 and 12 storeys. Of the 556 homes built, 375 will be built specifically for the build-to-rent (BTR) scheme, while the remaining 181 will go for sale, homes for private sale are centered in block A, the tallest of the five blocks at 26 and 23 storeys, while homes in the remaining four blocks will be for private rent. There will also be around 8,500 sq ft of residential amenity space spread throughout the blocks, alongside 29,000 sq.ft of external amenity space. It is understood that there is the intention to implement the consent shortly.
- 4.15. There are also plans to create a new high street centered around two aspects; a fashion and textile hub focused on the design community, and a "Brewhouse" centered on "interactive food and retail concepts". There will be 37,600 sq ft of commercial space in total, largely fronting a new central avenue and New Bridge Street to the south of the site. Commercial units will be spread over the buildings' first three floors.
- 4.16. A key part of the Old Brewery Garden proposals is the inclusion of a vibrant new boulevard which will border the Proposed Development. The majority of these commercial spaces will front this boulevard to be animation to the streetscape, and generate activity and interest as a destination.

- 4.17. Therefore the Proposed Development will make a significant contribution to the regeneration of the area and act as a catalyst for further developer investment in this part of Manchester.

Site Specific Environmental Designations

Air Quality

- 4.18. The Site is situation in the Greater Manchester Combined Authority Air Quality Management Area (AQMA).

Ecology

- 4.19. There are no ecological designations within the Site. The closest Special Area of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) is the Rochdale Canal SSSI and SAC. This designation refers to the part of the canal located 5.5km north east of the Site.
- 4.20. There are no international designated sites within 15km of the Site and there are no nationally designated sites within 2km. Therefore, there are unlikely to be direct or indirect impacts from the Proposed Development on any statutory designated sites during construction and operational phases of the development.
- 4.21. The Site itself predominantly consists of hard standing and bare ground, there is a low quality hedgerow adjacent to the Site. The Site was cleared over 10 years ago and currently functions as a temporary car park. There are no habitats on the Site which function as priority habitats.

Flood Risk and Drainage

- 4.22. The Environment Agency has classified the entire site is located in Flood Zone 2, which is defined as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding. Referring to Planning Practice Guidance, the proposed residential-led development is appropriate in Flood Zones 1 and 2, and with no sequential test being necessary.
- 4.23. The Site also falls within the Conurbation Core Critical Drainage Area in the Salford and Trafford Critical Drainage Area (CDA), designated in 2011.

Heritage

- 4.24. The Site is not located within a Conservation Area and there are no listed buildings on Site. The Site does not contain any Scheduled Monuments, or Registered Parks and Gardens.
- 4.25. However, the Site is located approximately 180m to the north of the Cathedral Conservation Area, and there are a number of Listed Buildings within a 300m radius. These are:
- Former Synagogue Grade II (List Entry: 1208420)
 - Gatehouse of HMP Manchester Grade II (List Entry: 1254670)
 - Main Prison Block of HMP Manchester Grade II (List Entry: 1254636)
 - Manchester Parcel Post Office Grade II (List Entry: 1389630)
 - North Bridge Grade II (List Entry: 1392698)
 - Middle Bridge Grade II (List Entry: 1392488)
 - Victoria Station Including Concourse to Rear With Restaurant And Booking Hall Grade II (List Entry: 1254725)
 - Stephenson Bridge Grade II (List Entry: 1392489)
- 4.26. These buildings are all grade II listed and are located over 100m from the Site. There are no assets which may be considered as 'non-designated heritage assets' within the Site and the settings of those non-designated heritage assets identified beyond the Site boundary have already been

altered due to the rapid development in the area during the late twentieth and early twenty-first centuries.

- 4.27. The Manchester Cathedral and Cheetham's School are not situated within this 300m study area, but due to their status as Grade I listed structures, and their proximity to the site, they are considered within the Heritage Statement prepared by Salford Archaeology.

Transport

Pedestrian

- 4.28. The Site is located at the edge of the city centre and is therefore well connected for both pedestrians and cyclists, and within walking distance of a range of employment, shopping, amenity and civic functions within Salford and Manchester City Centre.
- 4.29. Access to the Site will be provided on the western boundary of the Site from a ghost-island priority arrangement from Great Ducie Street (A56) which is being delivered as part of the Manchester College development (App Ref: 124995/FO/2019). Additional pedestrian access will be provided along the Great Ducie Street frontage.

Cycle

- 4.30. Cycling is an increasingly popular mode of transport and is an effective mode for short trips. There are a number of national, regional and local cycling routes in reasonable proximity to the Site. Given the 'edge of city centre' location of the Proposed Development, pedestrian accessibility to the surrounding area is very good.
- 4.31. Cycling England recommends 8km as a maximum cycling distance in the document 'Integrated Cycling into Development Proposals' and the CIHT document 'Planning for Cycling' states that cycling has the potential to substitute for car trips under five miles (8km). The entire city centre and further afield is therefore accessible by bicycle.
- 4.32. The general topography of Strangeways and Manchester City Centre and the wider area is reasonably flat which should assist in encouraging future residents of the Proposed Development to travel by cycle.
- 4.33. In addition, Greater Manchester benefits from the Bee Network cycling and walking infrastructure. This is currently delivered through the Mayor's Challenge Fund. The vision for the Bee Network is to make Greater Manchester the very first city region in the UK to have a fully joined up cycling and walking network. There is an anticipated expansion of the existing Bee Network as proposed in the City Centre Transport Strategy (2021).

Train and Metrolink

- 4.34. Victoria Railway and Metrolink Station is within 500m of the Site, approximately a 5 minute walk. The station is an important hub on the north-west railway network and serves destinations throughout Greater Manchester and the north of England. The Victoria Station Metrolink Station offers high-frequency services (up to 10 per hour) across Greater Manchester, including to Bury, Rochdale, Manchester Airport, Didsbury and Piccadilly.
- 4.35. Further services to local, regional and UK destinations are accessible from Manchester Piccadilly Station, located approximately 1.5km south east of the Site. This station provides access to a wide range of services to destinations further afield such as Liverpool, Leeds, Birmingham New Street and London Euston. Piccadilly Station provides a direct rail connection in just 22 minutes to Manchester Airport, allowing access to international destinations. Proposed plans for HS2 will also add a new Manchester terminus at Piccadilly.

Bus

- 4.36. The Site benefits from a high number of bus stops located along Great Ducie Street and the Cheetham Hill Road, as well as those within the City Centre.
- 4.37. The early start times and the availability of services in the peak hours are conducive to commuters travelling to and from the Site.

Car

- 4.38. Immediately to the southeast of the Site, Great Ducie Street meets the Inner Ring Road (A6042 Trinity Way and A6042 New Bridge Street), which provides connections to the strategic road network.

Design Brief

- 4.39. The brief identified the potential to transform this location at the edge of the City Centre into a place of aspiration and quality, through creating a high-quality residential development that will contribute to the regeneration of the Great Ducie Street area and help to catalyse future phases of development. As part of this it will complement proposed developments for The Manchester College and at Old Brewery Gardens in order to help shape a new thriving neighbourhood benefiting from the amenities and connections offered by the proximity of Manchester city centre.
- 4.40. The brief set out:
- Optimise the amount of quality residential accommodation that can be incorporated on the site
 - Create a mixed use, inclusive and tenure blind community in a new Manchester neighbourhood, offering a mix of unit sizes and typologies for different households. Deliver biodiversity gains through landscaped private and public amenity spaces for the new residents
 - Promote active travel and shape residents' habits by encouraging the use of public transport, walking and cycling
 - Respond to the local context to deliver an attractive scheme with a strong identity
 - Ensure that environmental sustainability is designed into the scheme addressing climate change challenges
 - Integrate within the vision for the SRFs
 - Create a safe and secure environment with passive visual surveillance
- 4.41. From this brief, the proposals for 461 new homes and ground floor commercial space were developed which will help to create a sustainable mixed-use development within the emerging Great Ducie Street SRF area. The scheme will support biodiversity net gain and achieve compatibility with operational net zero carbon.
- 4.42. The Proposed Development will transform the existing underutilised brownfield site and within each of the two buildings will be ground floor commercial space. These spaces will bring further vitality to the area and complement the Manchester College use and the ambitions of Old Brewery Gardens. At the heart of the scheme is a courtyard pocket park which will be open to members of the public and which will make a significant contribution to open spaces within the City Centre.

Proposed Development

Use and Amount

- 4.43. The Proposed Development will be predominantly residential-led with complimentary commercial spaces at ground floor. Whilst Manchester's residential market is becoming well developed, there is a recognised need for balanced housing growth, including a mix of higher value homes and affordable homes. The proposals will include a mixture of private market sale accommodation, and 5% on-site affordable housing. The provision of affordable housing is discussed further in Section 5 of this Statement.
- 4.44. Three commercial spaces are being provided as part of the development and when combined extend to approximately 718 sqm (GIA). This proposed mix of uses will form a distinctive sense of place and ensure vitality throughout the day. These communal and commercial spaces provide a strong focal point for residents and visitors to congregate, helping to facilitate a safer and more vibrant atmosphere. As noted above, these spaces will also complement the commercial units proposed at Old Brewery Gardens as well as provide an offer for the students and staff at Manchester College.
- 4.45. The proposed floorspace figures and associated use classes are set out in detail in the table below:

Table 4.1: Summary Proposed Development

Measurement	Proposed
Proposed Site Area	Total: 0.5 ha
Residential Use	461 new homes (Use Class C), providing a residential mix of: • 1 bed (2 person) apartments – 146 (32%) • 2 bed (3 person) apartments – 179 (39%) • 2 bed (4 person) apartments – 120 (26%) • 3 bed (5 person) apartments – 16 (3%) Of which 23 apartments will be affordable housing tenure.
Commercial Use	718 sq. m (GIA) across 3 units to be occupied by a suitable mix of retail, commercial and leisure uses (Use Classes E): • Unit 1 - 156 sq. m • Unit 2 - 328 sq. m • Unit 3 - 234 sq. m
Open Space	949 sqm (10,219 sq ft) publicly accessible courtyard space 263 sqm (2,838 sq ft) residential podium terrace space

Measurement	Proposed
Development Height	- Block A – 10 to 11 storeys - Block B – 17 to 27 storeys
Car and Cycle Parking Spaces	No car parking is being provided on the Site, aside from up to 5 disabled access spaces. 1 cycle parking space per apartment will be provided on site (461 spaces total); and 14 residential visitor cycle parking spaces and 12 commercial cycle parking spaces will also be provided within the publicly accessible external areas.

- 4.46. The Proposed Development will provide high-quality residential accommodation, recognising the opportunity for the Site to deliver new homes in a highly sustainable location and support the economic growth of Manchester. The proposed uses are consistent with the development principles set out within the Great Ducie Street and Former Boddingtons Brewery SRFs.
- 4.47. Residential amenity is provided with both internal and external spaces to enjoy, play, rest and share a sense of community for residents. Along the eastern side of the courtyard, a flexible resident's co-working space opens out on to both the courtyard and the boulevard, providing opportunities for residents to have space to work, and the opportunity to meet their neighbours in a communal environment.
- 4.48. Residential amenity is further enhanced with a south-facing terraced rooftop space at Floor 20 in Building B. Open on three sides, it provides views across the Manchester city centre skyline, and provides residents a peaceful outdoor environment with planting, seated areas and space for yoga or other activities.
- 4.49. As noted above, the Proposed Development includes 3 commercial units designed and configured to be flexible spaces, with potential to be further subdivided. This ties in with the SRF vision to link the wider developments in the area to create a sense of neighbourhood.
- 4.50. Significant consideration has been given to securing appropriate tenants in the commercial units, in order to ensure they support and enhance the Applicant's vision for the site, and provide additional amenity for residents and surrounding developments. The vision for these units is to create a version of the modern high street (albeit on a small scale), with a sustainable mix of commercial units.

Scale and Massing

- 4.51. The massing steps up from 10 storeys fronting the Great Ducie Street and up to 27 storeys towards the Old Brewery Gardens development. Building A, which fronts Great Ducie Street has a simple form and includes a slight step-up away from the college up-to 11 storeys. Building B steps from 17 storeys to 20 storeys and finally to 27 storeys. This varied massing of Building B adds further visual interest and complements the emerging skyline. Surrounding the pocket park is a one storey building which includes cycle stores and ancillary uses and has been designed to create a sense of enclosure and privacy to the park.

Layout

- 4.52. Please refer to sections 4.8 of the Design and Access Statement for details on the layout arrangements.

Pocket Park

- 4.53. The proposals have sought to create a new high quality and publicly accessible open space. This central courtyard space has been designed to provide a pocket-park within very close proximity to the city where existing and future residents and visitors to the area can walk or cycle through, or stop to sit and experience the micro-environment of greenery, trees and plants, increasing connectivity to nature.
- 4.54. The key principles in the courtyard landscape design are to open and connect to the surrounding streets, to punctuate movement through the site with opportunity for engagement and to carve out interesting landscape elements within these public spaces. The design approach to the spaces therefore seeks to create open and inviting access points leading into the developments at strategic junctions and locations to where it is envisaged people will want to move through and between the spaces. Pedestrian priority within the spaces has helped shape the access and servicing strategy, with the aim of minimising the impact of vehicles within the spaces to create more usable and attractive public realm.
- 4.55. The Proposed Development will secure an opportunity to implement beneficial measures such as habitat creation that will safeguard habitats for wildlife such as birds and bats, providing a net gain in biodiversity in accordance with the principles of the NPPF. The Ecology Report submitted alongside this application sets out bio-diversity enhancement measures which will be considered by the Applicant as the proposals move into a detailed design phase.
- 4.56. Overall, the public realm will create an inclusive environment for existing residents and workers, visitors and future residents alike. It will increase the biodiversity of the Site, contribute to carbon sequestration, and will positively contribute to the network of accessible green infrastructure provision within the city.

Construction Programme and Methodology

Introduction

- 5.1. This chapter of the ES describes the proposed construction programme and provides a review of the potential impacts of the construction works along with reviewing the necessary mitigation measures. It is supported by an Outline Construction and Environmental Management Plan prepared by Bridgehead Consulting.
- 5.2. This report has been prepared to support an application for full planning permission for the proposed construction of the project. This is an initial plan and has been prepared in advance of the appointment of the Main Contractor.
- 5.3. This document has been developed following the engagement with all stakeholders regarding the proposed development of the site. The purpose of this document is to outline the principles of the construction methodology and construction logistics for the proposed site works and is subject to refinement as the project evolves and the Main Contractor is appointed on the development.
- 5.4. This report details the proposed outline programme and key activities for the construction works with potential significant environmental impacts associated with these activities being identified and, where necessary, proposals for mitigation are outlined in consideration to the requirements of MCC.
- 5.5. The development will likely procure a single Main Contractor for the entire construction works with the appointed Main Contractor supervising and overseeing all works. The Main Contractor, when appointed, will use this report as a basis for further preparation of its own working site activity which will be submitted at a later date.

Outline Programme

- 5.6. The outline timescales for delivering the development after planning are estimated as follows:
 - Estimated start on site: July 2022
 - Estimated piling construction period: October 2022 to May 2023
 - Estimated superstructure construction period: June 2023 to July 2025
 - Estimated completion date: August 2025

Site Establishment

Site Hoarding

- 5.7. An early activity will be to protect and enclose the site before construction activity commences. A solid hoarding will be employed to the whole perimeter of the site boundary and maintained at all times. Site hoarding will be 2.5m high, painted and made of solid outdoor grade plywood. Where the hoarding is set into the road, temporary vertical concrete barriers will be installed at the base of the hoarding for added protection. Concrete blocks will also be deployed where the highway meets the pitlane.

- 5.8. The site hoarding line will include low level lighting where the hoarding line fronts the public highway. This lighting will only be illuminated in the dark autumn nights and overnight.
- 5.9. Signage will be displayed on the hoarding for health and safety purposes, Considerate Constructors Scheme signage and a point of contact for the neighbouring residents.

Welfare & Accommodation

- 5.10. It is fundamentally important to provide a safe and comfortable environment for all sites workers, therefore, site establishment and welfare accommodation will be installed to provide a high quality and secure site.
- 5.11. Typical site accommodation will include:
- Main Contractor management offices and meeting rooms;
 - Welfare facilities including canteen, drying/changing rooms as well as toilet and shower facilities;
 - Security office;
 - Sub-contractor facilities.
- 5.12. There are 3 potential locations for the welfare and accommodation placement:
- Option 1: Outside site boundary (double stacked on top of the gantry and parallel to A56 Great Ducie Street).
 - Option 2: Within the site boundary (at the location of the proposed cycle stores).
 - Option 3: Within the site boundary (parallel to the hoarding to the North of the site).
- 5.13. These locations will be explored further as the Main Contractor comes on board and prior to commencement on site.

Parking Arrangements

- 5.14. There will be no parking provided for construction worker vehicles on the site nor will there be any off-site provision. Parking will not be allowed on the site and all contractors and sub-contractors will be advised through their contract documentation that no parking is available and that all personnel should use sustainable transportation.

Hours of Site Working

- 5.15. The working hours for construction activities will be in line with requirements of the Control of Pollution Act 1974 Part III and the site will operate in accordance with the following Manchester City Council guidance:
- Monday – Friday 7.30am – 6pm
 - Saturday: 8.30am – 2pm
 - Sunday/Bank Holidays: No work
- 5.16. The workforce may arrive on site 30 minutes prior to work commencing but there is to be no working outside of these times (unless changed by prior agreement with Manchester City Council).
- 5.17. Noise is to be kept to a minimum in the first hour and site operations on a Saturday should be avoided where possible.

Construction Logistics

Considerations

- 5.18. As the site is located in a busy area of central Manchester, it is important to consider how the site will be serviced and the impact of construction logistics on the surrounding area. Construction logistics planning is both considered at a macro and micro level.
- 5.19. Construction logistics planning allow project and design management teams to understand how their proposed project design will be impacted by site and vehicle movements.
- 5.20. Within construction logistics planning, access and egress routes are determined to offer the least congested solution for vehicles, cyclists and pedestrians to the site and surrounding area.
- 5.21. Site activity must avoid any unnecessary disruption to the local community and ensure the safe and efficient operation of the construction phase of the project. Planning of the construction logistics process ensures site operations are effectively planned, managed and monitored to keep the project site moving safely without compromising productivity.
- 5.22. The traditional backbone of construction logistics has always been delivery & traffic management, waste management, material distribution, welfare provision, site security and safety.

Construction Logistics Plans

- 5.23. All vehicles delivering or collecting from the site are to approach and leave site via the A56 Great Ducie Street. All vehicles are to exit right towards the M60 and avoid the A6042 (South). The set up of each of the three options is shown within the CEMP.

Construction Logistics & Cyclist Safety (CLOCS)

- 5.24. The standard for construction logistics; managing work related road risk (WRRR) is the result of collaboration between construction clients, logistic operators and industry associations.
- 5.25. The document draws together emerging practices from a number of individual standards, policies and codes of practice into one common WRRR standard. This common standard is implemented by developers and can be adhered to in a consistent way by fleet operators.
- 5.26. The standard aims to ensure that construction companies follow effective practice in the management of their operations, vehicles, drivers and construction sites. Each requirement has been developed to reduce the risk of a collision between heavy goods vehicles in the construction sector and vulnerable road users such as cyclists and pedestrians.
- 5.27. The standard sets the detailed minimum requirements to create a consistent baseline but is written in a way that encourages road safety to be managed ever more rigorously as new best practice emerges. The CLOCS standard is a key step to demonstrate the commitment of construction logistics industry organisations to improve road safety throughout the supply chain.
- 5.28. The contractor will be required to operate both the Fleet Operator Recognition Scheme (FORS) and Construction Logistics and Cyclist Safety (CLOCS) safety schemes whilst working on site.

Vehicle Site Access

- 5.29. We have proposed access of a one-way route from A56 Great Ducie Street into the private road on the College land to allow for articulated vehicle deliveries.
- 5.30. All deliveries to site should be undertaken through an electronic Delivery Management System (DMS), managed by the construction logistics team, with all deliveries allocated to a specific time slot.
- 5.31. Failure to adhere to the time slot may result in a sub-contractor's delivery being denied entry as there will be no allotted vehicle holding zones on the public street to allow access to the site.

- 5.32. The delivery management process and system is integrated into the traffic management planning and operation to ensure the two work proactively together to reduce the impact of vehicle congestion. They will also be co-ordinated with crane and hoist movement on site. This provides the safest and most sustainable working solution of segregation to the workforce from material deliveries. All movement and unloading of both contractors, over the private road will be managed by a 3rd party traffic management company.

Pit Lane Delivery Areas

- 5.33. Due to the limited area available within the site footprint the proposed use of pit lanes, to enable the delivery of materials, will be required on the new private road.
- 5.34. The private road is currently being used to support the construction of the Manchester College City Centre Campus. To avoid congestion (to both projects and neighbouring stakeholders) we have consulted with the neighbouring projects contractor to agree access and usage of the new private road.
- 5.35. This will ensure we have sufficient access and use of the disabled parking bays for the proposed pit lane delivery areas that will service the site.
- 5.36. Traffic management will manage all site related traffic and take responsibility for supervising and directing all vehicle and pedestrian movement in and around the site.

Traffic Management

- 5.37. A traffic management approach is key to construction logistics and will be crucial to the success of the Boddingtons Brewery site.
- 5.38. The primary responsibility of the traffic management team is to ensure safe and sustainable flow and movement of construction traffic on, off and around the site.
- 5.39. The commitment to the CLOCS industry standard not only ensures that all fleet services will be compliant with the FORS silver standard (as a minimum) but also means the construction logistics team are dedicated to ensuring that the construction traffic is safely managed, protecting sites and local communities from collisions and pollution.
- 5.40. There will be safe demarcation routes for the workforce throughout the site, with the traffic management team ensuring all vehicles are safely banked away from the site to protect all stakeholders.

Vehicle Site Egress

- 5.41. The success of the Boddingtons Brewery site will rely on the management of site egress, ensuring construction vehicles do not impact the traffic flow on A56 Great Ducie Street.
- 5.42. The hoarding line is to be installed at the back of the pavement so the footpath can still be used, from the new private road running parallel to A56 Great Ducie Street. Effective traffic management and retractable barriers are to be used to ensure safe egress of construction traffic from site.
- 5.43. Upon consultation with Manchester City Council regarding use of A56 Great Ducie Street, the proposed construction logistics plans do not require pit lanes on the public road and will also ensure the existing bus lanes will remain operational. For access and egress, there is segregation between both pedestrian and vehicle traffic with turnstile access located on the North-West corner of the site.

Hoists, Lifts & Cranes

- 5.44. External hoisting positions will be required for use during the construction of Boddingtons Brewery. As a general principle, all deliveries to site will be off-loaded within the site boundary. All

cranes will be suitably sized and coordinate with the oversailing licences by the appointed Main Contractor to ensure that there will be no height clashes with the existing adjacent buildings.

- 5.45. Due to the requirement of multiple cranes within a tight area, the crane strategy should be considered carefully by the appointed Main Contractor.
- 5.46. The key issues are:
- Collisions of cranes at height;
 - Over sailing of adjacent properties;
 - Over sailing of public highways (and infrastructure routes).
- 5.47. Furthermore, hoists can often operate inefficiently (with half loads going up to the floors). Through central delivery management, there is unbiased movement of materials. Deliveries go to the relevant location on the same day regardless of time of arrival (ready for use the next day). All hoist checks are to be done correctly and any faults found must be logged and reported to the Main Contractor to alleviate any the time lost.

Delivery Route

- 5.48. All deliveries to site will be undertaken through an electronic delivery management system, managed by the construction logistics team, with all deliveries allocated a specific time slot. Typically, failure to adhere to the time slot may result in a sub-contractor's deliver being denied access to the site. There will be no waiting on the street for access to the site.
- 5.49. Construction vehicle traffic will be directed away from Manchester city centre and would be required to take the route which utilises the M60 and A56, as shown in the CEMP.

Delivery Management

- 5.50. Managing site deliveries is critical to the logistical planning and movement of a construction site with poorly managed deliveries causing significant project delay and disruption. All material deliveries will be planned to be off loaded and taken directly to the floor level where the materials are required or to be pre-assigned to lay down areas.
- 5.51. Effective and efficient delivery and material management will also promote safe operative movement around the site and allow for easier transportation of materials within the site by the sub-contractors.
- 5.52. A web-based delivery management system will be used to manage and control all collections and deliveries from the site.
- 5.53. A Delivery Manager will supervise all vertical deliveries, with the constriction logistics team taking over all material distribution from delivery to the floor plate.
- 5.54. The access gates are to be manned and an operative will control pedestrian flow while the vehicle is being directed into the site. The gates will be designed as not to encroach on the footpath, highway or into the site. A similar process will be adopted for vehicles exiting site.
- 5.55. Operatives will ensure suitable pedestrian and vehicle segregation using extendable gates (or similar) on either side of the pedestrian walkway. This will ensure pedestrians do not cross vehicular paths, as well as ensuring they do not gain access to the site. The same arrangement will be provided at the exit gate from the site.
- 5.56. The Main Contractor will manage a Just-in-Time delivery policy for all site materials and deliveries

Loading & Unloading

- 5.57. Materials must be pre-loaded in a manner that will ease off-loading and onward site handing e.g. palletised goods, pre-slung reinforcing and mesh, stillages or crates for flat panels and glass must clearly identify lifting/handling arrangements, with panels, glass sheets individually secured to stillage/crates where possible to prevent any load shedding during panel/glass removal. All such stillages must be stored on firm and level ground.
- 5.58. Suitable arrangements must be in place to provide access to vehicle loads where required e.g. for Banksmen (slingers/signallers) to eliminate persons needing to access the rear of vehicle and therefore minimise the risk of falling.
- 5.59. Loading & Unloading bays must have (as a minimum requirement):
- No unloading to take place at other locations;
 - Concrete hard standing or equivalent;
 - Road markings and clearly defined zone;
 - Scissor type extendable metal barrier;
 - Clear signage displaying 'permit to work area -lifting operations taking place';
 - Connected crowd barrier controlling access/egress;
 - Banksman – only Banksman and FL driver permitted to enter zone;
 - Permit – white board named access rights and TC delivery;
 - FL 360 degrees camera and 'zone' camera at suitable location.

Consolidation Centres

- 5.60. Fragmented material supply chains as well as environmental and quality consideration have forced the construction industry to consider how it can evolve to ensure equipment and materials are delivered; Just-In-Time, on suitable vehicles and in the right quantities and condition.
- 5.61. The consideration and use of Consolidation Centres have become a popular solution to the aforementioned problems associated with material supplier chains.
- 5.62. The process for managing delivery and consolidation centres is based upon extensive planning and programming to ensure optimum efficiency in delivery and productivity promotion, whilst minimising traffic impact around site.

Public Path and Road Closure/Access

- 5.63. Full road closures are to be avoided throughout the works, with the primary proposals to only include parking bay suspension and pavement closures.
- 5.64. The current Project Development Programme proposes that public path closures to a section of the Great Ducie Street footway will be required to allow for the project foundation, ground floor, first floor and scaffolding to be erected.
- 5.65. The current timeframe for this stage is approximately 6 months. This timeframe is indicative and is subject to the Main Contractor's submission of the Project Construction Programme.
- 5.66. Public paths will then be reopened with public and project protection measures in place and they will include:
- Gantry and cladding
 - Barriers at vehicle egress sites

- Placement of Traffic Marshalls to manage safety of pedestrians and vehicle movement
- Security CCTV

Waste Management

- 5.67. Control of waste material on site is a key factor in the successful outcome of a project and BREEAM requirements. The Main Contractor will agree and implement a Site Waste Management Plan (SWMP) at the commencement of the works. The strategy should be based around locating waste vessels in central locations.
- 5.68. Wheelie bins will be utilised to remove waste from the various work locations. Site operatives would then deposit the waste materials into the wheelie bins or larger items directly into the skips. The construction logistics team would then be responsible for co-ordinating the removal of the full wheelie bins and empty them in the correct allocated skips, with full bins being replaced with empty ones on removal.
- 5.69. Furthermore, the skips will be continuously replaced regularly to ensure space for waste material is always available.
- 5.70. Through the production of a sustainable procurement strategy, the Main Contractor will set targets for responsible sourcing of materials. This will use product certification such as FSC, ISO 14001, BES 6001 etc and will encourage products to be selected based on Environmental Product Declarations where possible.
- 5.71. The Main Contractor must have 100% chain of custody certification on timber products (i.e. FSC and PEFC) and will develop a black list of products/materials that are either harmful or come from unsustainable sources. The Main Contractor will also reduce the amount of waste to landfill through increased recycling and reuse of materials.
- 5.72. The BRE Smartwaste tool will be introduced to measure and benchmark the impacts of the site (CO2 emissions, energy use, water use, transport to and from site and pollution).
- 5.73. Sub-contractors are to actively investigate measures to reduce the level of CO2 creates as a result of their activities.
- 5.74. This will include interrogating the supply chain to identify opportunities to eliminate part-loads and gain full visibility of the supply chain to ensure that the correct materials are being manufactured in line with the developing programme for delivery site in a truly Just-In-Time basis.
- 5.75. Delivery miles to site, fuel type, vehicle type and size will be recorded for all vehicles attending the site.

Site Security

- 5.76. The site security for the project will be in operation from the outset. The traffic management plan is to be integrated with the site security plan to enable affective access and egress to the project, thus minimising disruption to local traffic, businesses and stakeholders.
- 5.77. Paying specific attention to access and egress touch points, working with a Security Industry Authority (SIA) approved security contractor, the Main Contractor will deploy static site guarding and mobile patrol services to act as a deterrent to non-authorised personnel and carry out checks to those entering the project on a daily basis.
- 5.78. Combining physical checks with biometric, facial recognition and access control systems, the Main Contractor will be able to give a true account of who is on and off site at any time.

- 5.79. Physical security barriers are to be installed to provide a deterrent to unauthorised access to site with Closed Circuit Television (CCTV) to be installed at intervals of no more than 20ms apart.
- 5.80. The internal and external boundaries of the site will be patrolled regularly in line with the approved risk and threat assessment with clear site security signage displayed around the external perimeter of the project.
- 5.81. The security team will liaise with the local police Safer Neighbourhoods Team (SNT) to share intelligence and ensure mutual understanding of any threats. This will include but not be limited to creating and agreeing a stakeholder escalation and reporting protocol.

Operative Travel

- 5.82. It is anticipated that the majority of construction workers will travel to the site by public transport and personnel will be given detailed information on travel options.

Vehicular Analysis

- 5.83. In the early stages of the project there will be a variety of vehicles, plant and equipment requiring access to the site. Some of the vehicles will access the site on a regular turnover basis and some on a one-off or infrequent basis. This is shown in Table 5.1.

Table 5.1 Summary of Vehicle Trips and Distribution

Vehicle Type	Use	Distribution
Ridged Heavy Goods Vehicle (HGV)	Excavated material removal	Strategic road network to motorway
Small Articulated Vehicle	Plat, steel bar, bricks, and building materials	Strategic road network to motorway
Specialised Articulated HGV	Tower crane erection and dismantle, mechanical and electric plant, façade materials, roofing materials.	Strategic road network to motorway
Specialised Equipment Low loader	Occasional delivery of plant	Strategic road network to motorway
Vans	Plant service, materials, other suppliers.	Distributed to local and strategic network
Cars	Occasional deliveries, couriers etc.	Distributed to local and strategic network

Potential Impacts During Construction

- 5.84. A review has been undertaken of the potential source of adverse impacts, which can be associated with carrying out construction works. The results of this are presented in the Table 5.2 below:

Table 5.2: Potential impacts and headline mitigation measures during de-construction and construction

Issue	Potential impacts	Mitigation
Noise	Increased road noise levels from vehicles. Increased noise levels from plant during excavation, piling and general constructions	Defined working hours, baffles to certain plant, local acoustic screening.

Issue	Potential impacts	Mitigation
	works (e.g. from the use of air compressors and diamond cutters).	Vehicle routing Beepers, radios etc to be silenced. Engines turned off and all measures outlined in the Considerate Constructors Scheme.
Vibration	Increased vibration levels from vehicles. Increased vibration levels from plant during de-construction, piling and general construction works. Defined working hours. Selection of appropriate plant and work procedures.	Phased deliveries to minimise numbers of vehicles attending site, Vehicle routing Engines to be switched off when vehicles are idle or on site
Dust / Air Quality	Windblown dust from ground surfaces, stockpiles, vehicles, work surfaces and cutting and grinding of materials. Exhaust emissions from lorries and plant delivering and removing materials, including dust and particulates	Cover all open backed vehicles, “water down” de-construction activities, switch off vehicle engines when parked. Regular and controlled monitoring of air quality, including agreement and implementation of trigger and action levels.
Waste	Waste generation and its disposal	Instigate Site Waste Management Plan and recycling programme.
Water	Increase sediment loading to storm-water system. Potentially contaminated storm-water run-off.	Do not allow direct discharge of water into sewerage / storm-water collection system
Traffic	Potential localised traffic congestion caused by site traffic. Local traffic diversions will be required for tower crane erection / dismantle and mobile cranes lifts. Increased vehicle movements mainly consisting of Heavy Goods Vehicles (HGVs) Nominal levels of transfer of mud and material from vehicles onto the public highway. Disruption from abnormal or hazardous loads. Exhaust emissions.	Phased deliveries to minimise numbers of vehicles attending site, switch off vehicle engines when parked, minimise abnormal loads. Vehicle routing.
Storage of fuels and construction materials	Accidental spills, discharge to drains/storm-water systems. Contamination to ground	All fuel tanks, etc, to be bunded, no discharge allowed into the sewerage / storm-water collection system.
Pedestrian access	Restrictions on pedestrian access to surrounding walkways, footpaths and roads.	Erect protective gantries over footways.

Issue	Potential impacts	Mitigation
Hazardous and contaminated materials	Exposure of the workforce to deleterious / hazardous materials and contaminated land, mobilisation of any source contaminants and creation of pathway from source to groundwater receptor.	Site investigation reports to indicate if any contaminated fill is present. COSHH assessments and careful implementation of associated working method statements to ensure that no hazardous materials find a path to groundwater source.
Ecology	Water / mud run off into drains.	Do not allow direct discharge of water into sewerage / storm-water collection systems, utilise interceptors where necessary.
Energy usage	Indirect impacts associated with energy consumption such as CO ² emissions, depletion of natural resources, air pollution etc	Site environmental plan to be implemented.
Views	Views impacted and/or impeded from construction equipment, particular cranes.	Tower crane to be positioned, as far as practical, to have minimal impact upon adjacent views.

Safety, Health, Environmental & Quality

- 5.85. The management of safety, health, environmental & quality is a crucial element to all UK construction sites. Construction sites are high-risk areas which can present life threatening situations if not properly managed.
- 5.86. The site will be managed in line with the Construction (Design and Management) Regulations 2015, and all associated legislation, including environmental responsibilities placed on the duty holders. The duty of care owed to those directly involved, and those indirectly affected by the project, will be recognised and managed in line with regulatory guidance, and industry best practice.
- 5.87. One of the aims of this plan is to facilitate the safe and timely completion of the project, while ensuring the that clear lines of communication are always available to those with an interest in the project, and those in the local community looking for reassurances for their own interests.
- 5.88. The health, safety and well-being of all individuals associated with the appointed Main Contractor, supply chain and stakeholders is an integral part of the site operation. To safely and efficiently manage the site, the following areas will be required as part of the site establishment:
 - Clear health and safety information and signage in the offices and worksites, holding regular toolbox and site talks as well as issuing internal communications via email and notice boards.
 - Before any member of the team enters the site, whether one of the appointed Main Contractor's own workers or part of the supply chain, they must have undertaken the relevant induction training, hold the correct qualifications and are equipped with the correct PPE.
 - Due to the scope of the site, there is going to be a consistent need to ensure clear walkway and access between the buildings and well marked safe access and egress across the site.
 - Health and safety are a mandatory aspect of all site operations, focused on ensuring the safety, well-being and protection of the workforce at all times.

Flood Risk & Surface Water Drainage

- 5.89. The flood risk & surface water report has found the site is at low risk of flooding from most sources. The surface water drainage strategy for the new development site will be to discharge surface water discharge into Great Ducie Street.
- 5.90. Attenuation has been proposed in the form of geocellular storage (subject to detailed design). The new surface water networks will be designed in line with current British Standard and Sewers for Adoption Guidance up to the 100-year storm return period including an allowance for climate change.
- 5.91. Beyond the 30-year criterion out of chamber flooding may occur and flood water will be directed away from the building to the external areas, where it will then be directed back into the drainage network as pipe water levels recede.

Considerate Constructors Scheme

- 5.92. The appointed Main Contractor, sub-contractors and consultants will be required to enrol and comply with all the requirements of the considerate constructor's scheme, which is administered by the Construction Industry Board.
- 5.93. This voluntary code of practice seeks to:
- Minimize any disturbance or negative impact (in terms of noise, dirty and inconvenience) sometimes caused by construction sites to the immediate neighborhood;
 - Eradicate offensive behavior and language from sites.
 - Recognize and reward the contractor's commitment to raising standard of site management, safety and environmental awareness beyond statutory duties.
- 5.94. Principally, the requirement will be for all stakeholders to pay their employees the Real Living Wage as defined by the Living Wage Foundation. There will also be a requirement that all apprentices are to be paid the adult minimum wage rather than the under 25 value (same wage for the same job regardless of age).
- 5.95. Contractors must also provide safe sites to work on and live near to. Therefore, the requirement is to operate to high standards of Health & Safety and set targets for significant reductions of AIIR (accident injury incident rates).

Wheel Wash Management

- 5.96. The site has designated loading area that will also serve as wheel wash areas for vehicles leaving the confines of the site.
- 5.97. A road sweeping machine will be periodically employed as required to either brush clean the roads around the site or in periods of dry weather wet down the highway to control the dust.
- 5.98. All ground or surface water run-off will be strictly controlled in line with environmental legislation and best practice to prevent pollution of drains and watercourses.

Dust Suppression

- 5.99. Some activities have the potential to create large amounts of dust. During these activities the following dust suppression methods can be utilised:
- The use of filters to remove particulars from the air. This method is particularly useful in small and enclosed spaces. It is not to be used outdoors or in large areas.

- Dust extraction can be used to remove dust from the air into a central receptacle i.e a vacuum. This is particularly useful for specific tasks such as cutting or drilling.
 - Water based dust suppression will be used for large scale dust suppression. The dampening down of material before, during and after breaking, cutting or disturbing. The use of a garden hose, pressurized water canisters or water misting cannons.
- 5.100. When reasonably possible working methods can be enacted to prevent the creation of dust altogether. Some activities such as demolition to use dust suppression at all times during works. Dust suppression methods will be in line with the principles and recommendations of the 'Control of Dust and Emissions from Construction and Demolition – Supplementary Planning Guidance *July 2014 London Plan 2011' and the 'Control of Dust from Construction and Demolition Activities'.
- A road-sweeping machine will be periodically deployed as required to either brush clean the roads around the site or (in periods of dry weather) wet down the highway to control the dust
- 5.101. Dust suppression will be controlled at the working face and will be carted away area by a fine water supply. The quantity of water emitted by the sprays will be regulated and controlled to prevent any flooding at the ground water level.

Noise Pollution

- 5.102. Unless specified otherwise works will be in accordance with the standards set out in B.S 5228:2008 Code of Practice of Noise Control on Construction and Open Sites with all reasonable steps taken to minimise any noise disruption to adjacent businesses and residential properties.
- 5.103. Operatives working in noisy areas will be monitored to ensure they are wearing the necessary protective equipment and that they are not exceeding their permitted exposure periods.
- 5.104. Where it is necessary to carry out noisy activities, these will be identified well in advance by the Main Contractor and the timing agreed prior to commencement. Particularly noisy activities such as piling will commence after 9am.
- 5.105. Several methods are to be taken to mitigate noise levels and the nuisance caused including.
- The use of acoustic barriers. These are best suited to noise coming from a particular area and can be fixed to fence panels to surround the noisy works. They are most effective when they are as close to the noise creation as reasonably possible.
 - The use of electricity from the incoming main, avoiding the use of generators on site.
 - The banning of radios and other speakers for non-construction related activity.
 - The use of modern plant and machinery.
 - Pneumatic tools used only when a reasonable alternative is not available and fitted with mufflers or silencers when reasonable possible.
- 5.106. All plant and equipment to be used for the works will be properly maintained, silenced where appropriate to prevent excessive noise and switched off when not in use and where practical.

Vibration Suppression

- 5.107. To mitigate vibration absorbed by operatives (HAVS) all tools will be checked for their HAVS rating and used in accordance to the HSE recommendations on safe working time using the Ready Reckoner.
- 5.108. Should the tools have vibration reduction options, these must be used at all times.

- 5.109. To prevent ground vibrations (which could compromise structure), continuous ground vibration monitoring is to be installed with any construction activity deemed to create high levels of vibration.

Air Quality

Introduction

- 6.1. This Chapter of the ES has been prepared Air Pollution Services (APS) and assesses the likely significant effects in relation to air quality as a result of the Proposed Development upon the site and surrounding area. This Chapter also describes the methods used to assess the likely significant effects, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual effects (if any) after these methods have been adopted.
- 6.2. This Chapter is accompanied by the following Technical Appendices that include figures and further details of the dispersion modelling completed:
 - Appendix 6.1: Air Quality Technical Details
- 6.3. The authors of the chapter have significant relevant qualifications and experience required for preparing Air Quality ES Chapters for EIA developments:
 - Mr Laxen is a Director of APS and has over thirteen years' experience in the field of air quality. Kieran is an active member of the Institute of Air Quality Management (IAQM) committee developing guidance in relation air quality assessment and modelling. He has extensive experience of air quality monitoring, modelling and assessment both permitting and planning applications.
 - Mr Wescott is an Assistant Consultant of APS and has over two years' experience in Air Quality Consultancy, gaining significant experience working on a wide range of planning applications, including carrying out ES Chapters, Air Quality Assessments, Monitoring Assessments, Odour Assessments, Air Quality Neutral Assessments and Emissions Mitigation Assessments. He is a capable dispersion modeller having used ADMS Roads, Breeze AERMOD and Breeze Roads. Additionally, he has worked on several large, high-profile EIA projects, carried out assessments on important infrastructure projects and was involved with construction dust monitoring for the Thames Tideway Tunnel project.

Legislative, Policy Context and Guidance

- 6.4. The following legislation and policy is relevant to consider when assessing air quality effects.

Legislation

Air Quality Standards, Critical Levels/Loads, Limit Values and Air Quality Objectives

- 6.5. The Environment Act 1995 (HMSO) sets out the requirements of the Local Air Quality Management (LAQM) regime and the requirement for the Government to produce an Air Quality Strategy including standards and objectives.
- 6.6. The latest Air Quality Strategy was published in 2007 (Defra, 2007) and sets out the Air Quality Standards (AQS), which consider the effects on human health and ecosystems, and The National Air Quality Objectives (NAQOs) for ambient pollution. The NAQOs for use by local authorities when considering human health were incorporated into UK legislation within the Air Quality (England) Regulations, 2000, Statutory Instrument 928 (HMSO, 2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (HMSO, 2002). In addition to the NAQO for protection of human health set out in the Air Quality Regulations, both critical levels

and critical loads are defined for protection of ecosystems. These critical levels and critical loads also form part of the NAQOs in the strategy.

- 6.7. The Strategy explains that the AQSs for the protection of human health are defined as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. An exceedance is a breach of the threshold for the concentration for the specific averaging period. In terms of ecosystems the AQS are based on the critical levels and critical loads, which are derived for habitats and exceedance of these values are used as an indication of the potential for harmful effects to systems at steady state thus giving an indication of risk to the system. Critical loads are values of pollutants deposited below which significant effects do not occur. Critical levels the concentrations of pollutants above which direct adverse effects on vegetation or ecosystems may occur.
- 6.8. The NAQOs set out the extent to which the Government expects the AQS to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility, and possible timescales. NAQO are policy targets often expressed as a maximum ambient concentration, for a specific averaging period, not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale.
- 6.9. The Strategy describes the Local Air Quality Management (LAQM) regime that has been established by Part IV of the Environment Act 1995, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an AQMA and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives. The strategy also provides the policy framework for air quality management and assessment in the UK.
- 6.10. In addition to the NAQOs set within the Air Quality Strategy, the European Union (EU) has also set limit values for the protection of human health and critical levels for the protection of ecosystems. These were transposed into the Air Quality Standards Regulations (HMSO, 2010) which sets out the UK limit values, target values and critical levels for specific pollutants. Like the NAQOs, the limit values, target values and critical levels are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year (if any) and a date by which it must be achieved. Some pollutants have more than one value covering different dates or averaging times. While the NAQOs are policy targets, the government has the duty to ensure compliance with the legally binding limit values which is a national obligation rather than a local one.
- 6.11. The 2019 Clean Air Strategy (Defra, 2019a) includes a commitment to set a “*new, ambitious, long-term target to reduce people's exposure to PM2.5*”. The WHO acknowledges that current evidence suggests no safe level for PM2.5. However, the WHO set a guideline, which is 5 µg/m³ as an annual mean and is very stringent. The WHO also set interim objectives, the fourth and lowest of which is 10 µg/m³. Following the UK leaving the EU the Government have set into law the Environment Act, which commits the secretary of state to setting a PM2.5 objective by October 2022, which may be in line with either the WHO AQG or fourth interim objective.
- 6.12. In addition, the recent coroners court case investigating a young girl's death in 2013 concluded that air pollution was a significant contributing factor to both the induction of her asthma and the exacerbation of her symptoms, due to exposure in exceedance of WHO guidelines for pollutants.

National Planning Policy

National Planning Policy Framework

- 6.13. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2021d) sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

Paragraph 174: "Planning policies and decisions should contribute to and enhance the natural and local environment by: 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".

Paragraph 180: "When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate."

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".

Paragraph 186: "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

Paragraph 188: "The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume

that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

Paragraph 55: “Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.”

The Planning Practice Guidance

- 6.14. The NPPF is supported by Planning Practice Guidance. The PPG on air quality published in November 2019 states:

Paragraph: 001 Reference ID: 32-001-20191101: “The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified.”

Paragraph: 002 Reference ID: 32-002-20191101: “It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.

Paragraph: 005 Reference ID: 32-005-20191101: “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”.

Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:

“Considerations that may be relevant to determining a planning application include whether the 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; and 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; and Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."

Paragraph: 007 Reference ID: 32-007-20191101: "Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

Paragraph: 008 Reference ID: 32-008-20191101: "Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Sub-Regional Planning policy

Greater Manchester Combined Authority - The Places for Everyone Joint Development Plan (Draft)

- 6.15. The Draft Places for Everyone Joint Development Plan Document (2021) produced by the Greater Manchester Combined Authority (GMCA) has recently closed local consultation and will shortly be sent for Examination. The plan sets out the spatial framework for development in the region to guide appropriate development, investment and infrastructure. The plan has a draft policy on Clean Air (Policy JP-S 6), this policy states:

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

- 1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;*
- 2. Determining planning applications in accordance with the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;*
- 3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data and, if approved, to make appropriate provision for future monitoring of air pollution;*

4. *Restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation;*
5. *Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments;*
6. *Implementing the charging Clean Air Zone within the Plan area, as directed by Government and associated measures;*
7. *Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;*
8. *Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;*
9. *Controlling traffic and parking within and around schools and early years sites;*
10. *Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and*
11. *Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."*

Air Quality Action Plans

- 6.16. Between 2005 and 2006 10 AQMAs were declared over the extent of Greater Manchester based on modelled $35 \mu\text{g}/\text{m}^3$ isopleths for annual mean NO_2 . This was converted into a single AQMA of reduced size in May 2016. Most of the site lies within the AQMA except for the northern corner.
- 6.17. A 2016 – 2021 Air Quality Action Plan (AQAP) (Greater Manchester Combined Authority & Transport for Greater Manchester, 2021) has since been published that include measures to improve local air quality. The current air quality improvement initiatives mentioned in the plan include; physical improvements to the transport network, increasing travel by sustainable modes, encouraging smarter travel through improved fares, ticketing and information, management of demand for car travel and promotional campaigns, extending the enforcement of idling vehicles, lobbying central Government for a national HGV scrappage scheme and better integration of transport and new development.

Local Planning & Air Quality Policy

Manchester City Council – Local Development Framework Core Strategy

- 6.18. Manchester City Council's Local Development Framework Core Strategy (2012) guides the spatial strategy for development within Manchester. As part of the assessment the Air Quality Policy EN16 will be considered. This policy states:

"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 plant. 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.”

- 6.19. The plan also has policies on Sustainable Transport (T 1) and Development Management (DM 1) which make some small mentions of air quality.

Air Quality Guidance

Guidance on Land-Use Planning & Development Control: Planning for Air Quality

- 6.20. Environmental Protection UK (EPUK) in partnership with The IAQM have produced guidance on Land-Use Planning & Development Control: Planning For Air Quality (2017). EPUK and IAQM have produced this guidance to ensure that air quality is adequately considered in the land-use planning and development control processes. It provides a means of reaching sound decisions, having regard to the air quality implications of development proposals and provides guidance on how air quality considerations of individual schemes may be considered within the development control process, by suggesting a framework for the assessment of the impacts of developments on local air quality.

LAQM Technical Guidance

- 6.21. Defra and the devolved administrations have published a guidance document on Local Air Quality Management (LAQM) - Local Air Quality Management Technical Guidance (TG16), Revised April 2021 (2021). This document is designed to support local authorities in carrying out their duties under the Environment Act 1995, the Environment (England) Order 2002, and subsequent regulations. LAQM is the statutory process by which local authorities monitor, assess, and take action to improve local air quality. The Technical Guidance provides tools, approaches and technical information related to air quality.

IAQM Guidance on the Assessment and Control of Dust from Demolition and Construction

- 6.22. The IAQM produced guidance on the assessment of dust from demolition and construction (2014). This document provides a risk-based methodology for assessing construction impacts, including demolition and earthworks where appropriate. The guidance has been used throughout this assessment, which should be read in conjunction with the guidance document.

A guide to the assessment of air quality impacts on designated nature conservation sites 2020

- 6.23. The IAQM have produced guidance to assist in the assessment of the air quality impacts of development on designated nature conservation sites (2020). The guidance focuses on air quality assessments in support of Habitats Regulations Assessments (HRA), but also considers the approach for assessing the air quality impact on national or local designated nature conservation sites.

Assessment Methodology and Significance Criteria

Scope of Assessment

- 6.24. A Scoping Report (Appendix 2.1) was prepared and sets out the scoping process for each Chapter. Whilst it was not submitted to MCC, the broad scope of the ES was discussed with MCC and which included scoping in the Air Quality discipline.

Effects Not Considered to be Significant

- 6.25. No effects were considered to be insignificant in the EIA Scoping Report.

Likely Significant Effects

6.26. The following effects were considered likely to be significant in the EIA Scoping Report:

- Demolition and Construction generated dust impacts on the local area.
- Construction non-road mobile machinery (NRM) emissions on the local area.
- Construction Traffic HGV emissions on the local area.
- Changes in concentrations at locations of relevant human health exposure in the local area.
- Changes in concentrations at locations of relevant ecological sites in the local area.
- Impacts on the future users of the Site.

Effects No Longer Considered to be Significant after the EIA Scoping Report

6.27. The following has since been considered not significant and scoped out of assessment.

6.28. Changes in concentrations at locations of relevant ecological sites in the local area due to road traffic emissions. These are determined to be not significant as there is no net traffic generation expected as a result of the Site's operation and therefore no roads within 200 metres of a designated ecological site will be affected by the Site. This judgement has been made based on the IAQM guidance to assist in the assessment of the air quality impacts of development on designated nature conservation sites.

Background Studies to Inform the ES

6.29. Consideration of the baseline conditions within the area of the Site have been made based on the following:

- Industrial and waste management sources that may affect the area have been identified using the European Pollutant Release and Transfer Register (European Environment Agency, 2019). Local sources have also been identified through examination of maps and the Council's Air Quality Review and Assessment reports.
- Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority and where available other monitoring networks. This covers both the Site and the surrounding area, the latter being used to provide context to the assessment.
- Background concentrations of NO₂, PM₁₀ and PM_{2.5} have been defined using the national pollution maps published by Defra (2021b). These cover the whole of the country on a 1x1 km grid of average concentrations.
- Predicted roadside concentrations of NO₂ in the study area have been identified using the maps of roadside concentrations published by Defra (2019b) as part of its 2017 Air Quality Plan for the baseline year 2015 and for the future years 2017 to 2030. These maps are used by the UK Government, to report exceedances of the limit value to the EU. The national maps of roadside PM₁₀ and PM_{2.5} concentrations, which are available for the years 2009 to 2015, show no exceedances of the limit values anywhere in the UK in 2015.
- Predicted concentrations as part of the clean air zone modelling (Transport for Greater Manchester, 2021).

Impacts and Effects of Construction and Demolition Dust on local sensitive receptors

6.30. The assessment method follows the approach provided by the IAQM guidance document. This approach follows a sequence of steps:

- Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required.

- Step 2 is to assess the risk of dust impacts.
- Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site.
- Step 2b defines the sensitivity of the area to any dust that may be raised.
- Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation.
- Step 3 uses this information to determine the appropriate level of site-specific mitigation required to ensure that there should be no significant impacts.
- Step 4 is to examine the residual effects and to determine whether or not these are significant.

6.31. The approach developed by IAQM, divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

Site Suitability Assessment - Modelling Approach

The Site Occupation Year

6.32. Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted for the earliest likely occupation year of the Site of 2024.

Modelled Receptors

6.33. Pollutant concentrations have been predicted at seven receptor locations within the Site, each on the first and second floor, representing a range of locations, including of worst-case exposure at the Site in relation to road traffic emissions. The receptor locations are described in Table 6.1 and their locations are identified in Figure 1 in the Technical Appendices.

Table 6.1 - Modelled Sensitive Receptors

Receptor	Floor ^a	Height (m)	X Coordinate	Y Coordinate
R1	First	6.5	383732.4	399271.2
R2	First	6.5	383742.4	399247.1
R3	First	6.5	383752.1	399223.6
R4	First	6.5	383749.5	399278.0
R5	First	6.5	383768.7	399230.4
R6	First	6.5	383773.5	399285.3
R7	First	6.5	383804.5	399243.0
R1	Second	9.5	383732.4	399271.4

Receptor	Floor ^a	Height (m)	X Coordinate	Y Coordinate
R2	Second	9.5	383742.4	399247.5
R3	Second	9.5	383752.1	399223.6
R4	Second	9.5	383749.4	399278.1
R5	Second	9.5	383768.8	399230.4
R6	Second	9.5	383773.5	399285.4
R7	Second	9.5	383804.6	399243.1

Table Notes:

a Receptors on the first floor were not considered as the use classes of this floor are commercial and ancillary so are not classified as sensitive locations for air quality.

b All receptors are within the Site.

- 6.34. An additional receptor (R8) was modelled at 20.2 metres of height. This height was defined based on a review of the potential impacts from the nearby combustion plant. The highest predicted concentration resulting from boilers on the nearby Manchester College are predicted in a contour plot at 20.2 m, in the relevant Environmental Statement Appendices (Avison Young, 2019) (Figure 9.9).

Road Traffic Impacts Modelling

- 6.35. Concentrations have been predicted using the ADMS-Roads atmospheric dispersion model (v5) with the latest vehicle emission factors available from Defra's Emission Factor Toolkit (EFT) (v10.1). ADMS-Roads was developed and validated by Cambridge Environmental Research Consultants (CERC). The model is used extensively throughout the UK for dispersion modelling and is accepted as an appropriate tool by local authorities. The model requires a range of input parameters which are discussed below.

Modelled Roads

- 6.36. The road links, widths, heights, and street canyons included in the dispersion model have been aligned with data from Ordinance Survey maps, google maps and considering distances based on a range of mapping sources ensuring relative distances from the roadsides to receptors and monitoring sites are carefully set. The modelled road links, speeds, and street canyons near to the Site are shown in Figure 2 within the Technical Appendices. Additional roads near to local monitoring sites were included to verify the model. These are shown in Figure 3 and Figure 4 within the Technical Appendices.

Traffic Data

- 6.37. 2019 Traffic data has been taken from DfT count points and growthed to the assessment year of 2024. Traffic flows from nearby committed developments were also added. This data includes Annual Average Daily Traffic (AADT) flows, Heavy Goods Vehicles (HGVs) and buses and coaches for major roads around the UK.
- 6.38. Where appropriate, the vehicle speeds have been reduced to take account of slower speeds at junctions and queuing. A summary of the traffic data used in the model is presented in Table 1 in the Technical Appendices. Discussion of traffic growth factors used and additional traffic flows added to the base flows from committed developments of interest (identified in the Cumulative Effects section) are discussed in the Technical Appendices (paragraph 5).

Consideration of Combustion Sources in the Neighbouring Committed Developments

- 6.39. The process contribution (PC) from combustion plant at the two closest committed developments has been added to the road traffic and background contributions in Table 6.14.

Limitations and Assumptions

- 6.40. The assessment involves a range of uncertainties, including the model inputs, assumptions, the model, model verification and post-processing of model results. The largest factors that are likely to affect uncertainty are:
- Reliability of traffic data.
 - Estimation of traffic speeds.
 - Meteorological Data.
 - Inherent uncertainties within the ADMS-Roads model.
 - Complexity of modelling accurate canyon parameters.
 - Background concentrations.
- 6.41. Further details of modelling, verification and meteorological factors that affect that could affect the precision and accuracy of the results are found in the Technical Appendices.

Reporting of the Environmental Effect and Significance Criteria

- 6.42. The duration of the effect has been assessed as either 'short-term', 'medium-term' or 'long-term'. Short-term is considered to be up to 1 year, medium-term is considered to be between 1 and 10 years and long-term is considered to be greater than 10 years.

Determining Sensitivity (or Value / Importance) of Receptor

- 6.43. The sensitivity of affected receptors has been considered on a scale of high, medium, low or negligible.
- 6.44. The assessment is carried out in consideration of the locations of relevant exposure. There are two subtly different locations based on the two parallel regulatory requirements, those for the NAQOs and those for the Limit Value compliance purposes.

Air Quality Objective Receptors

- 6.45. The 2007 Air Quality Strategy explains that AQS and national air quality objectives NAQO were determined based on expert recommendations and represent "levels at which no significant health effects would be expected in the population as a whole". The NAQOs apply at locations

where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the NAQO.

- 6.46. The annual mean NAQO applies at locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, nurseries, hospitals, and care homes.
- 6.47. The 24-hour mean NAQO applies at the annual mean locations of exposure and at hotels, residential gardens and any location where members of the public might reasonably be expected to spend one day or longer.
- 6.48. The 1-hour mean NAQO applies at the annual mean locations of exposure and at hotels, residential gardens and any outdoor location where members of the public might reasonably be expected to spend one hour or longer, such as busy pavements, parks, balconies, terraces, and locations with outdoor seating.
- 6.49. Places of work like factories or offices are not considered places where members of the public might be regularly exposed and therefore the NAQO's do not apply at these locations.
- 6.50. All NAQO receptors identified in this assessment are considered to be of 'high' sensitivity, since the NAQOs only apply where there is relevant exposure (such as residential properties and educational facilities) and exposure at these locations are considered highly sensitive due to the health implications associated with air quality.

Limit Value Compliance Receptors

- 6.51. Defra reports Limit Value compliance based on their monitoring and modelling at locations which match specific parameters (including distance from road, proximity to junctions etc.). The compliance with the Limit Values should be achieved at any location where members of the public have access. However, in accordance with Article 2(1), Annex III, Part A, paragraph 2 of Directive 2008/50/EC, locations where compliance with the Limit Values does not need to be assessed include:
 - "a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation;*
 - b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and*
 - c) On the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation."*
- 6.52. The government models compliance with the Directive at locations 4 m from the kerbside, 2 m high, more than 25 m from major road junctions and adjacent to at least 100 m of road length where the Limit Value applies.
- 6.53. As these are Limit Values set to protect human health all relevant locations set out in this section are considered of high sensitivity.

World Health Organization Guidelines

- 6.54. The WHO criteria apply whenever there is relevant exposure in relation to each time period, for each pollutant. These are considered the same as those set out above for NAQO receptors.

Determining the Magnitude of Change

Impacts on Human Health in relation to Annual Mean Exposure – NAQO

- 6.55. There is no official guidance in the UK in relation to development control on how to describe the change in air quality. In the absence of official guidance the EPUK and IAQM guidance has been used. In regard to annual mean exposure, the magnitude of incremental change is described as a proportion of a relevant assessment level (NAQO) rather than using categories such as small, medium, large. To be consistent with the guidance no category has been assigned, however, the change proportions are:
- <1% of the assessment level (NAQO) when rounded, which could be classified for this ES as imperceptible;
 - 2-5% of the assessment level (NAQO) when rounded, which could be classified for this ES as small;
 - 6-10% of the assessment level (NAQO) when rounded, which could be classified for this ES as medium; and
 - >10% of the assessment level (NAQO) when rounded, which could be classified for this ES as large.
- Impacts on Human Health in relation to Annual Mean Exposure – Limit Values
- 6.56. There is no magnitude of change in relation to compliance with the limit values.

Short-term Impacts on Human Health

- 6.57. For impacts in relation to the 1-hour mean and 24-hour mean NAQOs it is not practical to define a magnitude of impact as the NAQOs related to a number of periods which can exceed the air quality standard threshold.

Determining the Level of Effect

- 6.58. There is no official guidance in the UK in relation to development control on how to describe air quality impacts and effects, nor how to assess their significance.

Effect on the Local Area – National Air Quality Objectives

- 6.59. The EPUK and IAQM guidance sets out the importance of differentiating between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria, which is standard practice, to determine the likely air quality impacts in relation to the NAQOs, which are then used to make a judgement of the overall effect on air quality.
- 6.60. Impact descriptors for individual receptors are defined based on the magnitude of incremental change as a proportion of a relevant assessment level (the NAQO), discussed in the previous section, and then examining this change in the context of the new total concentration and its relationship with the assessment criterion (the specific NAQO).
- 6.61. The terminology within Table 6.3 in the EPUK and IAQM guidance document does not match the terminology for the ES, therefore for the purposes of this ES, still with regards to impacts rather than effects, the corresponding terminology is set out below:
- Negligible and Moderate retain their meanings;

- Slight can be considered equivalent to Minor; and
- Substantial can be considered equivalent to Major.

- 6.62. Table 6.2 sets out the matrix for determining the impact descriptor for annual mean concentrations at individual receptors, based on Table 6.3 in the EPUK and IAQM guidance document.
- 6.63. Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.

Table 6.2 - Magnitude for Changes in Ambient Pollutant Concentrations

Long term average Concentration at receptor in assessment year**	% Changes in Concentration with development in relation to the National Air Quality Objective *				
		1	2-5	6-10	>10
	>110% of AQAL	Moderate	Major	Major	Major
	>102% - ≤110% of AQAL	Moderate	Moderate	Major	Major
	>95% - ≤102% of AQAL	Minor	Moderate	Moderate	Major
	>75% - ≤95% of AQAL	Negligible	Minor	Moderate	Moderate
	75% or less of AQAL	Negligible	Negligible	Minor	Moderate

Table Notes:

* % change rounded to nearest whole number. Where the % change is 0 (i.e. Less than 0.5%) the impact will be negligible

** The air quality assessment levels (AQAL) are 40 mg/m³ for annual mean NO₂ and PM₁₀ and 25 mg/m³ for PM_{2.5}.

Effect on the Local Area – Short-term impacts

- 6.64. The short-term (1-hour mean NO₂ and 24-hour mean PM₁₀ NAQOs) are assessed in relation to the risk of a breach in number of period (1-hour or 24-hour) exceedances.
- 6.65. Previous research carried out on behalf of Defra and the devolved administrations identified that, where road traffic emissions are the dominate pollutant source, exceedances of the 1-hour mean NO₂ NAQO are unlikely to occur where the annual mean is below 60 µg/m³ and exceedances of the 24-hour mean PM₁₀ NAQO are unlikely to occur where the annual mean is below 32 µg/m³.
- 6.66. Where these two thresholds (60 µg/m³ for NO₂ and 32 µg/m³ for PM₁₀) are not breached, the impact is described as Negligible.

Effect on the Local Area – Limit Values

- 6.67. Good practice in relation to the limit value assessment is to consider whether the Proposed Scheme delays compliance with or causes a breach of the limit values. The effect is based on whether any location which would be used for compliance reporting is impacted. A breach as a result of the Proposed Scheme is considered to be a major impact. A delay in compliance may be a significant effect depending on various factors include duration and magnitude of the breach.

Effect on the Local Area – WHO

- 6.68. The WHO air quality guidelines (AQGs) were updated in September 2021 (World Health Organization, 2021). The new AQGs are based on the latest epidemiological evidence of the health effects and apply to both outdoor (ambient) and indoor air. Exceedances of the AQGs are

associated with risks to public health. In recognition of the difficulty of meeting the AQGs a series of Interim Targets have been proposed.

- 6.69. The guidelines are not legally binding standards; however, they should be used to inform legislation and policy. The WHO AQGs are based solely on the latest epidemiological evidence, whereas the EU limit values and national air quality objectives were based on health evidence from the 1990s. They also take account of other factors such as the technical and economic feasibility of meeting the standard by a defined date.
- 6.70. The WHO guidelines are not currently in Regulations and there is no legal requirement for local authorities to meet them, although the Environment Act 2021 sets a requirement for a PM2.5 target.

Likely Significant Effects on the Local Area

- 6.71. The approach set out in the EPUK and IAQM guidance is that the assessment of significance should be based on professional judgement, with the overall air quality effect of the Proposed Scheme described as either 'Significant' or 'Not significant'. As such there is no magnitude to the level of overall effect, however, the effect can be classified as either 'beneficial' or 'adverse'.
- 6.72. The guidance explains that it is not straightforward to determine the effect at individual receptors by linking the potential of an effect to the impact descriptor. An assessment of air quality is used as proxy for health impacts. As such terms describing the effect at individual receptors which are used throughout this ES are not directly suitable but they are useful for consideration in determining the overall effect.
- 6.73. The generic ES terms are set out below:
- Major effect: where the Proposed Scheme is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This potential effect is generally considered to be 'Significant';
 - Moderate effect: where the Proposed Scheme is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This potential effect is considered more likely to be 'Significant' but will be subject to professional judgement;
 - Minor effect: where the Proposed Scheme is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the Proposed Scheme is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This potential effect is considered less likely to be 'Significant' but will be subject to professional judgement; and
 - Negligible: where the Proposed Scheme is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change. This potential effect is 'Not Significant'.
- 6.74. In general, where impact descriptors can be considered in isolation at an individual receptor, Moderate or Major impacts (Table 6.2) may be considered potential Moderate or Major effects, as per the ES effect terms, and therefore a likely a 'Significant' environmental effect, whereas negligible or minor impacts would not be. However, as explained in the EPUK and IAQM guidance:
- “several impacts [and equivalent effect terms] that are described as ‘slight’ [Minor] individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a ‘moderate’ or ‘substantial’ [Major] impact [and equivalent effect terms]*

may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health".

- 6.75. The overall statement of likely significant effects should take account of various factors including those in Table 2.3 which has been a tool which has assisted with this process, and factors derived from the EPUK & IAQM guidance including:
- The impact descriptors (and equivalent potential effect terms).
 - Where minor or greater impacts (and equivalent potential effect terms) occur, the number of receptors effected.
 - A judgement on the overall balance of receptors with different impact descriptors (and equivalent potential effect terms).
 - Whether or not an exceedance of a NAQO is predicted where none existed before.
 - The extent to which a NAQO or limit value is exceeded.
 - Compliance with the limit values.
 - Considerations of the WHO guidelines.
 - The site suitability assessment.
 - The uncertainty, comprising the extent to which worst-case assumptions have been made.

Site Suitability Assessment

- 6.76. The Site Suitability Assessment assesses the impacts of local emission sources on sensitive receptors with the Site.
- 6.77. There is no official guidance in the UK on how to assess the significance of air quality impacts of existing sources on a new development. The assessment of future receptors within the Application Site has been limited to predicting air quality at the Application Site and the significance of this is based on whether the NAQOs for each pollutant are exceeded or not.
- 6.78. The overall significance of the air quality effects is determined as either 'significant' or 'not significant', using professional judgement, giving consideration to various factors including those in
- 6.79. Effect on the Local Area – National Air Quality Objectives
- 6.80. The EPUK and IAQM guidance sets out the importance of differentiating between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria, which is standard practice, to determine the likely air quality impacts in relation to the NAQOs, which are then used to make a judgement of the overall effect on air quality.
- 6.81. Impact descriptors for individual receptors are defined based on the magnitude of incremental change as a proportion of a relevant assessment level (the NAQO), discussed in the previous section, and then examining this change in the context of the new total concentration and its relationship with the assessment criterion (the specific NAQO).
- 6.82. The terminology within Table 6.3 in the EPUK and IAQM guidance document does not match the terminology for the ES, therefore for the purposes of this ES, still with regards to impacts rather than effects, the corresponding terminology is set out below:
- Negligible and Moderate retain their meanings;

- Slight can be considered equivalent to Minor; and
 - Substantial can be considered equivalent to Major.
- 6.83. Table 6.2 sets out the matrix for determining the impact descriptor for annual mean concentrations at individual receptors, based on Table 6.3 in the EPUK and IAQM guidance document.
- 6.84. Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.
- 6.85. Table 6.2 which has been a tool which has assisted with this process. As such there is no magnitude to the level of overall effect, while the individual receptors have associated impact descriptors.
- 6.86. Whilst
- 6.87. Effect on the Local Area – National Air Quality Objectives
- 6.88. The EPUK and IAQM guidance sets out the importance of differentiating between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria, which is standard practice, to determine the likely air quality impacts in relation to the NAQOs, which are then used to make a judgement of the overall effect on air quality.
- 6.89. Impact descriptors for individual receptors are defined based on the magnitude of incremental change as a proportion of a relevant assessment level (the NAQO), discussed in the previous section, and then examining this change in the context of the new total concentration and its relationship with the assessment criterion (the specific NAQO).
- 6.90. The terminology within Table 6.3 in the EPUK and IAQM guidance document does not match the terminology for the ES, therefore for the purposes of this ES, still with regards to impacts rather than effects, the corresponding terminology is set out below:
- Negligible and Moderate retain their meanings;
 - Slight can be considered equivalent to Minor; and
 - Substantial can be considered equivalent to Major.
- 6.91. Table 6.2 sets out the matrix for determining the impact descriptor for annual mean concentrations at individual receptors, based on Table 6.3 in the EPUK and IAQM guidance document.
- 6.92. Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.
- 6.93. Table 6.2 provides ranges, the level of effect is confirmed as a single level and not a range, informed by professional judgement. For each effect, it has been concluded whether the effect is 'beneficial' or 'adverse'.

Baseline Conditions

AQMAs

- 6.94. MCC has investigated air quality within its administrative area as part of its responsibilities under the LAQM regime. MCC declared a single AQMA in 2016 (replacing smaller more numerous AQMAs declared in earlier years) covering large parts of Greater Manchester, its boundaries being determined using a modelled NO₂ isopleth of 35 µg/m³. The reason a 40 µg/m³ isopleth wasn't

used is the 35 µg/m³ better accounts for uncertainties in the modelling. The AQMA has therefore been declared for exceedances of the longterm NO₂ air quality objective. The Site falls within the AQMA except for a small section of its northern corner.

Clean Air Zone

- 6.95. The Greater Manchester Clean Air Zone (CAZ) (2021), which will restrict highly polluting vehicles (not private cars) on most roads within the combined authority boundary via a charging mechanism, will be implemented in 2022 by the GMCA. The CAZ is aimed at reducing pollutant values in exceedance of the NAQOs in the shortest timeframe possible and is expected to assist Greater Manchester reaching compliance by 2024.

LAQM Monitoring

- 6.96. Monitoring locations within MCC as well as in neighbouring local authorities within Greater Manchester are included in GMCA's 2019 Air Quality Annual Status Report (ASR) (Greater Manchester Combined Authority) and 2021 ASR (Greater Manchester Combined Authority, 2021). There are 14 monitors within a two km radius of the Site, some within the administrative boundary of MCC and some within the administrative boundary of Salford City Council (SCC), as identified in Figure 3 in the Technical Appendices. One of these monitors represents an automatic monitor and the other 13 represent diffusion tubes. The three diffusion tubes co-located at the automatic monitor have not been considered.

Annual Mean NO₂

- 6.97. Annual mean NO₂ concentrations for the years of 2016 to 2019 are presented in Table 6.3, the concentration measured in 2015 is also presented for MAN3.
- 6.98. 2020 concentrations were also measured by MCC, however, they have not been presented as the data is not representative of current conditions. This is due to the impact of the COVID-19 pandemic restrictions and the changes it caused to air quality, such as through reduced traffic flows and altered traffic mix.
- 6.99. Measured NO₂ concentrations were above the annual mean NAQO level of 40 µg/m³ at nine of the total 14 monitoring sites within the 2 km buffer in 2019. Two of the 14 were within 10% of the NAQO level of 40 µg/m³ for 2019. The overall trend is for a decrease in annual mean measured NO₂ concentrations across the four-year period.

Table 6.3 - Measured NO₂ Annual Mean Concentrations (µg/m³)^a

Site ID – Name (type)	2015	2016	2017	2018	2019
MAN3 - Manchester Piccadilly Automatic Monitor (Urban Centre)	39	40	36	35	36
SA14 – Bury New Road near Wellington Street (Kerbside)	-	35.5	36.0	31.6	31.6
SA79 – Chapel Street near Oldfield Road (Roadside)	-	-	-	-	41.1
SA39 – Junction of Ring Road and Chapel Street (Roadside)	-	46.8	41.6	39.1	41.7
SA27 – Frederick Street (Roadside)	-	39.8	36.8	34.1	37.2

Site ID – Name (type)	2015	2016	2017	2018	2019
SA81 – Regent Road near Bridge over River Irwell (Roadside)	-	-	-	-	46.4
MAN26 – Chetham’s School of Music (Urban Background)	-	37.1	35.5	33.4	33.0
MAN88 – Angel Street near Rochdale Road (Kerbside)	-	52.7	47.5	44.3	43.3
MAN36 – Rochdale Road between Osborne Street and Whitley Road (Roadside)	-	40.1	34.0	33.1	31.7
MAN77 – Medlock Street near Little Peter Street (Urban Background)	-	44.2	38.8	41.0	43.7
MAN29 – Oxford Road near Wakefield Street (Roadside)	-	66.2	57.7	58.8	55.4
MAN24 – Near Manchester Cenotaph on Princess Street (Kerbside)	-	45.3	44.7	40.3	40.8
MAN09 – Newton Street near Dale Street (Kerbside)	-	51.9	51.1	45.8	44.9
MAN71 – Great Ancoats Street between Laystall Street and Store Street (Roadside)	-	51.2	50.4	46.1	45.3
NAQO / Limit Value / WHO Guideline	40				
WHO AQG Level (Interim targets) ^b	10 (40, 30, 20)				

Table Notes:

a Exceedances of the NAQO are presented in bold.

b Not required to be achieved within UK legislation.

1-hour Mean NO₂

- 6.100. The measured number of 1-hour mean NO₂ concentrations above 200 µg/m³ for the monitoring sites which measure 1-hour averages are presented in Table 6.4. Data for 2015 to 2016 for MAN3 have been obtained from Greater Manchester’s ASR. No exceedances of the 1-hour mean NO₂ NAQO were measured. There were exceedances of the WHO AQG level in 2015 and 2017.

Table 6.4 - Measured number of NO₂ 1-hour Concentrations above 200 µg/m³ ^a

Site ID – Name (Type)	2015	2016	2017	2018	2019
-----------------------	------	------	------	------	------

MAN3 - Manchester Piccadilly Automatic Monitor (Urban Centre)	1	0	1	0	0
NAQONNAQO / Limit Value	18				
WHO AQG Level ^b	0				

Tables Notes:

a Exceedances of the NAQO are presented in bold.

b Not required to be achieved within UK legislation. The guideline is 200 µg/m³ thus it exceeded in 2015 and 2017.

Annual Mean PM₁₀

- 6.101. Measured annual mean PM₁₀ concentrations for MAN3 which measures PM₁₀ are presented in Table 6.5. Measured PM₁₀ concentrations were below the annual mean NAQO of 40 µg/m³ between 2015 and 2019. The values are below the NAQO, limit value and WHO Interim Target level 3 for 2019, but above the WHO AQG level.

Table 6.5 - Measured PM10 Annual Mean Concentrations (µg/m3)

Site ID – Name (Type)	2015	2016	2017	2018	2019
MAN3 - Manchester Piccadilly Automatic Monitor (Urban Centre)	20	20	20	21	20
NAQO	40				
WHO AQG Level (Interim Targets) ^a	15 (70, 50, 30, 20)				

Table Notes:

a Not required to be achieved within UK legislation.

24-hour Mean PM10

- 6.102. The measured number of 24-hour mean PM₁₀ concentrations above 50 µg/m³ for MAN3 are presented in Table 6.6. The values are below the NAQO, limit value and below at least WHO Interim Target 3 for 2019, but above the WHO AQG level. Some exceedances of the 24-hour mean PM₁₀ NAQO were measured at the monitoring sites between 2015 and 2019.

Table 6.6 - Measured number of PM10 24-Hour Mean Concentrations > 50 µg/m3 ^a

Site ID – Name (Type)	2015	2016	2017	2018	2019
MAN3 - Manchester Piccadilly Automatic Monitor (Urban Centre)	3	3	3	2	7
NAQO	35 (50) ^b				
WHO AQG Level (Interim Targets) ^c	45 (150, 100, 75, 50)				

Table Notes:

a Exceedances of the NAQO are presented in bold

b Where data was low the 90.4th percentile of 24-hour mean concentrations has been provided in parenthesis.

c Not required to be achieved within UK legislation.

Annual Mean PM_{2.5}

- 6.103. Measured annual mean PM_{2.5} concentrations for MAN3 are presented in Table 6.7. The values are below the NAQO and limit value, and below the WHO Interim Target 3 for 2019, but above the WHO AQG level.

Table 6.7 - Measured PM_{2.5} Annual Mean Concentrations (µg/m³)

Site ID – Name (Type)	2015	2016	2017	2018	2019
MAN3 - Manchester Piccadilly Automatic Monitor (Urban Centre)	10	10	8	11	12
NAQO	25				
WHO AQG Level (Interim Targets)	5 (35, 25, 15, 10)				

Table notes:

a Exceedances of the NAQO are presented in bold

b Not required to be achieved within UK legislation.

AURN Monitoring

- 6.104. There are no Defra AURN sites located within two km of the Site.

Predicted Background Concentrations

- 6.105. Ambient background concentrations of NO₂, PM₁₀ and PM_{2.5} have been defined using the national pollution maps published by Defra (2021b). These cover the whole of the country on a 1x1 km grid for each year from 2018 until 2030. Concentrations for 2019 and 2024 have been extracted for the grid cells that surround the receptor locations. The values are presented in Table 6.8.
- 6.106. All predicted background concentrations are well below the NAQOs and limit values. With respect to the WHO Interim targets in both 2019 and 2024, NO₂ levels are below Interim Target 2 in both years and below interim target 3 for 2024, PM₁₀ levels are below the AQG in both years, and PM_{2.5} levels are below Interim Target 4 for both years.

Table 6.8 - Mapped background Concentrations (µg/m³)

Site ID – Name (Type)	NO ₂	PM ₁₀	PM _{2.5}
2019	21.4	12.4	8.1
2024	17.8	11.7	7.6
NAQO / Limit Value	40	40	25 ^a
WHO AQG Level (Interim Targets) ^b	10 (40, 30, 20)	15 (70, 50, 30, 20)	5 (35, 25, 15, 10) ^c

Table notes:

a The PM_{2.5} NAQO is not in regulations and there is no legal requirement for local authorities to meet it.

b The WHO guidelines are not in regulations and there is no legal requirement for local authorities to meet it.

Predicted Roadside Concentrations

Defra

- 6.107. Defra has predicted roadside concentrations of NO₂, PM₁₀, and PM_{2.5} for the main roads in the UK (Defra, 2019b) for the years 2017 to 2030 as part of Defra's commitment to report exceedances of the limit values. For both 2019 and 2024, there are no exceedances of the NO₂ limit value on the A56 or the A6042, as identified in Figure 4 in the Technical Appendices and as shown in Table 6.9. There are no exceedances of the PM₁₀ and PM_{2.5} limit values predicted in the local area, there are also no exceedances for PM₁₀ of the WHO AQG.
- 6.108. It should also be noted that it is widely accepted that in many locations in the UK Defra's modelling has underpredicted roadside concentrations when compared with local monitoring and these Defra roadside estimates should be treated with caution.
- 6.109. The earliest year that occupants of the Site might be exposed to local air pollution is 2024. Future occupants of the Site are unlikely to be exposed to concentrations above the NAQO as the site is 100 metres from the A6042, which is the busiest of the two considered roads and has the highest predicted concentrations at its roadside. The nearest main road to the application site is the A56 which is close to the western boundary of the site and only has a predicted concentration of 22.3 µg/m³ in 2024. Defra Predicted Roadside Concentrations for both PM₁₀ and PM_{2.5} are below the Limit Values for each respective pollutant in both 2019 and 2022, and below the WHO interim targets in both 2019 and 2024. PM₁₀ is also below the WHO AQG in 2019 and 2024 but PM_{2.5} exceeds the WHO AQG in 2019 and 2024.

Table 6.9 - Relevant Defra Predicted Roadside Concentrations (µg/m³)

Link (Census ID)	NO ₂		PM ₁₀		PM _{2.5}	
	2019	2024	2019	2024	2019	2024
A56 (36577)	28.3	22.3	13.1	12.7	8.7	8.2
A6042 (17822)	35.4	27.8	14.5	14.0	9.4	8.9
A6042 (73787)	33.2	26.1	14.0	13.6	9.1	8.7
Limit Value	40		40		25	
WHO AQG Level (Interim Targets)	10 (40, 30, 20)		15 (70, 50, 30, 20)		5 (35, 25, 15, 10)	

Table notes:

a Breaches of the limit value are in bold

b The WHO guidelines are not in regulations and there is no legal requirement for local authorities to meet it.

CAZ Modelling

- 6.110. Transport for Greater Manchester have modelled large sections of the city as part of the development of their CAZ. This modelling includes predictions of concentrations in 2022 and 2023 with the CAZ in operation. Roadside locations with exceedances in 2023 are identified in Figure 6-3 in the Air Quality Modelling Report for the Clean Air Zone (Transport for Greater Manchester, 2021). There are no roads with exceedances close to the Site.

Other Sources of Air Pollution

Permitted Facilities

- 6.111. The Environment Agency regulates sites which are at risk of contributing significantly to pollutant concentrations and maintains a database of these sites called the UK Pollutant Release and Transfer Register (PRTR) (European Environment Agency, 2019). The UK PRTR data has been used to fulfil the reporting requirements of the European Pollutant Release and Transfer Register (E-PRTR) which provides details of all regulated sites in the UK. The 2019 database has identified no regulated facility within 1 km of the Site.

Local Combustion Plant Sources

- 6.112. Combustion plant at two very close committed developments have been identified:
- four boilers are located at Manchester College; and
 - ten boilers are located at Old Brewery Gardens.
- 6.113. These developments are discussed further in the Cumulative Effects Section.

Overall Baseline Conditions

Air Quality Objectives

- 6.114. There are exceedances of the NO₂ NAQO at roadside locations, although the PM objectives are likely to be below the relevant NAQOs.

Limit Value Compliance

- 6.115. Existing levels of NO₂ are likely to breach the limit values in locations near to some busy roads in the local area. The PM limit values are unlikely to exceed the limit values.

World Health Organization Guidelines

- 6.116. The World Health Organization (WHO) have produced guidelines to protect human health from poor air quality. The revised guidelines will be breached in 2024, however improvement of concentrations are expected nationwide in future years; there will be many places that exceed the guideline. The Interim Target 1 of the NO₂ levels are currently being predicted to be met in 2022, and Interim Target level 2 will be worked towards in future years.
- 6.117. There is a reduced level of detail relating to PM concentrations, however, the PM₁₀ background concentrations are below the guideline of 15 µg/m³, in locations in close proximity to sources of particulate matter, such as vehicles on local roads. The PM_{2.5} background concentration exceeds the guideline of 5 µg/m³, but meets Interim Target Level 3.

Health Effects

- 6.118. The public Health Outcomes Framework (Public Health England, 2021) provides information on the fraction of mortality attributable to particulate matter (PM_{2.5}) air pollution (indicator D01). For MCC 5.25% of deaths in 2019 were attributed to PM_{2.5}, which is above the average for the Northwest of England of 4.50% and is slightly above the average for England of 5.13%. The long-term trend in proportion of deaths associated with exposure to PM_{2.5} is shown in Figure 7 in the Technical Appendices.

Identification and Evaluation of Significant Effects

Overview

- 6.119. The likely significant effects have been identified and evaluated for both the construction phase and the operational phase of the Site.

Construction Phase

- 6.120. The potential impacts from construction of the Site include emissions from non-road mobile machinery (NRMM), emissions from road vehicles and construction dust associated with the construction activities.

Non-road Mobile Machinery

- 6.121. The likely significant effects from construction traffic emissions have been determined following the approach recommended in IAQM guidance (Guidance on the assessment of dust from demolition and construction v1.1, 2014).
- 6.122. Emissions from NRMM during the Construction Phase of the Site are not likely to be significant sources of pollution. The IAQM guidance states that: *“experience from assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) [...] suggests that they are unlikely to make a significant impact on local air quality and in the vast majority of cases they will not need to be quantitatively assessed”*.
- 6.123. On this basis, significant effects as a result of NRMM emissions can thus be discounted since baseline concentrations are below the AQOs. The Impacts are negligible and therefore the effect is **Not Significant**.

Construction Traffic

- 6.124. Construction traffic data has been provided by the Construction Phase Consultants, Bridgehead Consultancy. An operative histogram analysis, shows that the peak construction HGV movements to and from site will be approximately 320 in Summer 2024. Therefore, as a daily figure (AADT) construction HGV movements will be approximately 10. This value has been assessed against the following criteria, and consideration of the impact of construction traffic in isolation is set out below.
- A change of LDV flows of:
 - more than 100 AADT within or adjacent to an AQMA
 - more than 500 AADT elsewhere.
 - A change of HDV flows of:
 - more than 25 AADT within or adjacent to an AQMA
 - more than 100 AADT elsewhere.
 - Where roads are realigned near to sensitive receptors and the change in alignment is 5 m or more and the road is within an AQMA.
 - Applies to junctions that cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights, or roundabouts.
 - Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.

- 6.125. The Site lies within an AQMA, therefore with the traffic data provided, there are less than 100 LDVs and less than 25 HDVs, the Impacts are negligible and therefore the effect is **Not Significant**.

Construction Dust Step 1

- 6.126. Step 1 of the assessment procedure is to screen the need for a detailed assessment. The guidance provides distance-based criterion in Box 1 of the guidance which states:
- 6.127. An assessment will normally be required where there is:
- a 'human receptor' within:
 - 350 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
 - an 'ecological receptor' within:
 - 50 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- 6.128. There are human receptors within the distances set out in the guidance, thus an assessment is required for human receptors. There are no ecological receptors within the screening distances and therefore effects on ecological receptors can be discounted as **not significant**.

Construction Dust Step 2 – Potential Dust Emission Magnitude

- 6.129. The guidance explains that the dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. The guidance provides examples of the magnitude classification for each of the potential stages.

Demolition

- 6.130. The existing site is a car park and therefore there will be no demolition of buildings prior to construction. Therefore, the dust emission class for demolition is considered Negligible.

Earthworks

- 6.131. The dust generated by the earthworks depends on the nature of the earth and soil at the site. The characteristics of the soil at the Site have been defined using the British Geological Survey's UK Soil Observatory website (2021), and are set out in Table 6.10. Overall, it is considered that, when dry, this soil has the potential to be slightly dusty.
- 6.132. It is not known the extent of earthworks on-site, however, it is assumed that there will be a need for earthworks in order to create foundations and landscaping for the Site. The approximate area for earthworks covers an area of 4,950 m². Dust will arise mainly from the handling and transport of dusty materials (such as dry soil). Based on the illustrative criteria in the IAQM guidance document, the dust emission class for earthworks is considered Medium.

Table 6.10 - Soil Characteristics at the Site

Category	Record
Soil layer thickness	Deep

Category	Record
Soil texture	Part of site is Light to Medium Sandy and the other part of site is Light to Medium Silty
Subsoil grain size	Part of site is Arenaceous-rudaceous grain size and the other part of site is Mixed (Argillic-Rudaceous) grain size
European Soil Burea description	Part of site has Glaciofluvial deposits and the other part of site has Glacial till subsoil

Construction

- 6.133. The Site includes the construction of a high-rise apartment building with commercial uses on the ground floor. Construction work will be required for the building of the Site. The total volume and material of the buildings are unknown but is estimated to be about 2,450,000 m³ and concrete. Based on the illustrative criteria in the IAQM, the dust emission class for construction is considered Large.

Trackout

- 6.134. The number of Heavy-Duty Vehicles (HDVs) leaving the site on a single day is unknown. Given the moderate scale of the Site, it is considered likely that there could be greater than ten HDVs driving onto the site per day but less than 50. Based on the use of the Site and taking worst-case approach, the IAQM Guidance dust emission class for trackout is considered Medium.

Summary of Potential Dust Emission Magnitude

- 6.135. Table 6.11 summarises the dust emission magnitude for the Site.

Table 6.11 - Summary of Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	n/a
Earthworks	Medium
Construction	Large
Trackout	Medium

Construction Dust Step 2 – Sensitivity of the Study Area

- 6.136. The guidance explains that the sensitivity of the area should take account of several factors including:
- the specific sensitivities of receptors in the area;
 - the proximity and number of those receptors;
 - in the case of PM10, the local baseline concentration; and
 - site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.
- 6.137. The IAQM guidance document provides examples of high, medium, and low sensitive receptors for each of the potential effects. These are provided in Box 6 to Box 8 of the guidance and

consideration should be given to the additional factors presented in Box 9 of the guidance. The guidance has also, helpfully, provided a series of matrices (Table 2, Table 3, and Table 4 of the guidance document) to determine the sensitivity of the area based on the receptor sensitivity, number of receptors, the proximity to the dust emission activity and baseline PM₁₀ concentration.

- 6.138. Residential properties are considered high sensitivity receptors to dust soiling and elevated levels of PM₁₀, while the commercial properties are medium sensitivity receptors. Some commercial properties, such as retail shops with windows, would be considered high sensitivity receptors to dust soiling.
- 6.139. Figure 9 in the Technical Appendices shows the site location with several bands representing 20 m, 50 m, and 100 m distances from the site boundary. There are around 10 medium sensitivity receptors within 20 m of the site boundary. Based on Table 2 of the IAQM guidance document, the sensitivity of the area to dust soiling impact will be Medium.
- 6.140. The maximum predicted annual mean PM₁₀ concentration for receptors at the Site based on the modelling carried out for 2024 is 13.5 µg/m³ (see Table 6.14). There are between 10 to 100 high sensitivity receptors within 50 m of the site boundary that are likely to be exposed to these concentrations from the site boundary. Based on Table 3 of the IAQM guidance, the sensitivity of the area to human health impacts due to elevated levels of PM₁₀ during the demolition, earthworks and construction stages will be Low.
- 6.141. Footnote C of Table 2 of the guidance explains that where there is a Medium dust emission magnitude for trackout there is a risk of material being tracked up to 200 m from the Site. It is expected that all construction-related vehicles will access the Site via the likely entrance at the south end of the Site on Great Ducie Street, shown in Figure 10 in the Technical Appendices. There are less than 10 medium sensitivity properties within 20 m of the roads along which material could be tracked, and thus the area is considered of medium sensitivity to dust soiling (based on Table 2 of the guidance) and low sensitivity for human health impacts (based on Table 3 of the guidance).
- 6.142. Table 6.12 summarises the sensitivity of the area around the proposed construction works based on the highest level of sensitivity determined for each stage.

Table 6.12 - Summary of Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

Construction Dust Step 2 – Risk of Dust Effect

- 6.143. The guidance has, helpfully, provided a series of matrices (Table 2, Table 3, and Table 4 of the guidance document) to determine the potential impact at receptors based on the receptor sensitivity, number of receptors and the proximity to the dust emission activity.
- 6.144. The dust emission magnitudes in Table 6.11 have been combined with the sensitivities of the area in Table 6.12 using the matrices in the guidance (Table 6, Table 7, and Table 8 of the guidance), in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 6.13.

Table 6.13 - Summary of Dust Risk for each stage

Potential Impact	Risk			
	Demolition ^a	Earthworks ^b	Construction ^c	Trackout ^d
Dust Soiling	No Risk	Medium Risk	Medium Risk	Low Risk
Human Health	No Risk	Low Risk	Low Risk	Low Risk

Table Notes

a Based on Table 6 of the IAQM guidance document.

b Based on Table 7 of the IAQM guidance document.

c Based on Table 8 of the IAQM guidance document.

d Based on Table 9 of the IAQM guidance document.

Construction Dust Step 2 - Significance of Effects

- 6.145. The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined.

Construction Dust Step 3

- 6.146. The risk categories set out in Table 6.13 have been used to determine the appropriate level of mitigation as set out in Mitigation Measures section (step 3 of the assessment procedure).

Operational Phase

Impacts on the Local Area

Traffic generation

- 6.147. The Site is intended to be a car free scheme. As such trip generation associated with the proposed development is likely to be low.
- 6.148. Impacts due to changes in road traffic flows on local roads have been considered in relation to the quantum of change and using the EPUK & IAQM guidance. The project transport consultant, Curtins, has confirmed that the net traffic generation from the Site is below the EPUK and IAQM screening criteria of 100 AADT within an AQMA. The impacts on air quality have been screened out as negligible following the guidance and scoped out of a detailed assessment in this ES chapter.
- 6.149. The impacts on air quality are described as negligible and therefore the effect is not significant.

On-site Combustion Plant

- 6.150. The Site will be provided with heating and hot water via electric heat pumps, which will not produce any emissions. The Site will, however, include a life-safety system for emergency situations, which will comprise a diesel fuelled generator. The emissions from the generator are unknown at this stage which is typical for planning applications. There is no regulatory requirement for emission limits on backup generators however the installed plant are likely to adhere to US EPA Tier 3 emission standards (equivalent to EU Stage IIIA). The maintenance schedule is currently unknown but well managed backup generators are tested and maintenance during the year and the testing/maintenance typically requires operation of the plant well below 50 hours per year. This is also a requirement in the Environmental Permitting Regulations for

emergency generators so can be expected. The main air pollutants of concern are NO₂ and fine particulate matter (PM₁₀ and PM_{2.5}), which will be released via a flue terminating two metres above the 26th floor, where there is likely to be a good dispersion environment. Other buildings in the local area, including committed developments, are at much lower heights. Given the infrequency and short durations of operation and the height of the flue location, the potential for impacts can be screened out without further consideration. To help minimise the effects of the generator upon local air quality it is recommended that the maintenance testing should not exceed 50 hours per year.

Overall

6.151. Overall, it is concluded that the impacts due to the proposed development on the local area will be negligible and the effect will therefore be not significant. The effect will be long-term in duration.

Impacts on the future users of the Site (Site Suitability)

6.152. The predicted pollutant concentrations at on-site receptors for the earliest likely operational year of the Site are presented in Table 6.14 as part of the site suitability assessment. The concentrations are compared against the NAQOs, limit values and the WHO AQGs and interim targets. The location of the receptors are identified in Table 6.1 in the Assessment Methodology and Significance Criteria section and in Figure 1 in the Technical Appendices.

Table 6.14 - Predicted 2024 Pollutant Concentrations at On-Site Receptors (µg/m3)

Receptor	NO ₂ concentration (µg/m ³)		PM ₁₀ Concentration (µg/m ³)	PM _{2.5} Concentration (µg/m ³)
	Road & Background	Including Plant ^a	Road & Background	Road & Background
R1	23.3	30.9	12.9	8.3
R2	26.0	33.6	13.5	8.7
R3	22.5	30.1	12.6	8.2
R4	21.4	29.0	12.4	8.0
R5	21.8	29.4	12.4	8.1
R6	20.6	28.2	12.2	7.9
R7	21.1	28.7	12.3	8.0
R8	22.3	29.9	12.6	8.2
R9	24.2	31.8	13.1	8.4
R10	21.8	29.4	12.4	8.1
R11	21.0	28.6	12.3	8.0
R12	21.5	29.1	12.4	8.0
R13	20.5	28.1	12.2	7.9

Receptor	NO ₂ concentration (µg/m ³)		PM ₁₀ Concentration (µg/m ³)	PM _{2.5} Concentration (µg/m ³)
	Road & Background	Including Plant ^a	Road & Background	Road & Background
R14	21.0	28.6	12.2	7.9

Table Notes:

^a Plant refers to the boiler emissions from Manchester College and Old Brewery Gardens.

- 6.153. The highest predicted NO₂ concentration is 33.6 µg/m³ at R2, the highest predicted PM₁₀ concentration is 13.5 µg/m³ at R2 and the highest predicted PM_{2.5} concentration is 8.7 µg/m³ at R2. The air quality effects on-site as a result of pollutant sources in the local area, as part of the Site Suitability Assessment, are judged as **not significant**.

Mitigation Measures

Mitigation included by design

- 6.154. The EPUK and IAQM guidance is clear that it is important that developments incorporate good design and best practice measures to ensure any impacts are minimised as far as practicable, even where pollutant concentrations are predicted to be below the NAQOs/limit values. This Site includes the following good design and best practicable measures by design:
- The Site will include substantial on-site storage for bicycles, encouraging use of this transport mode.
 - The Site is situated within 25 m of a bus stop, allowing easy access to sustainable modes of transport.

Recommended Mitigation

Construction Phase

Construction HGV Traffic Movements

- 6.155. The impact of construction HGV movements to and from the Site can be reduced using specified delivery routing and Consolidation Centres. An example plan in Manchester is shown in Figure 11 in the Technical Appendices.

Construction Dust

- 6.156. Measures to mitigate dust emissions will be required during the construction phase of the Site to minimise impacts upon nearby sensitive receptors.
- 6.157. The Site has been identified as a Medium Risk site for dust soiling effects during earthworks and construction, as a no Risk site during demolition and as a low risk during trackout. The Site has been identified as a Low Risk site for human health effects during earthworks, construction and trackout and as a no risk during demolition, as set out in Table 6.13.
- 6.158. It should be noted that the baseline PM₁₀ levels may exceed the WHO guideline and the sensitivity of human health effects could be considered high, rather than low, elevating the risk of human health effects to medium, rather than low. However, since a Medium risk of effects has already been identified for dust soiling, the mitigation measures will remain the same.
- 6.159. The GLA and IAQM guidance documents describe measures that should be employed, as appropriate, to reduce the impacts. These measures are shown in Table 6.15 to Table 6.18.

Table 6.15 - Communication

Mitigation Measures - Communication	Recommendation
General	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Highly Recommended
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	Highly Recommended
Display the head or regional office contact information.	Highly Recommended
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, realtime PM ₁₀ continuous monitoring and/or visual inspections.	Highly Recommended
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Highly Recommended
Make the complaints log available to the local authority when asked.	Highly Recommended
Record any exceptional incidents that cause dust and/or air emissions, either onsite or offsite, and the action taken to resolve the situation in the log book.	Highly Recommended
Monitoring	
Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	Desirable
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	Highly Recommended
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Highly Recommended
Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	Highly Recommended
Preparing and Maintaining the Site	

Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Highly Recommended
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Highly Recommended
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Highly Recommended
Avoid site runoff of water or mud.	Highly Recommended
Keep site fencing, barriers and scaffolding clean using wet methods.	Highly Recommended
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	Highly Recommended
Cover, seed or fence stockpiles to prevent wind whipping.	Highly Recommended
Operating Vehicle / Machinery and Sustainable Travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	Highly Recommended
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Highly Recommended
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	Desirable
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Highly Recommended
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	Desirable
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Highly Recommended
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly Recommended
Use enclosed chutes and conveyors and covered skips.	Highly Recommended
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly Recommended
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Highly Recommended
Waste Management	

Avoid bonfires and burning of waste materials.	Highly Recommended
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Table 6.16 – Measures Specific to Earthworks

Mitigation Measures - Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Desirable
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Desirable
Only remove the cover in small areas during work and not all at once.	Desirable

Table 6.17 - Measures Specific to Construction

Mitigation Measures - Construction	
Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Highly Recommended
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Desirable
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	Desirable

Table 6.18 - Measures Specific to Trackout

Mitigation Measures - Trackout	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Desirable

Mitigation Measures - Trackout	
Avoid dry sweeping of large areas.	Desirable
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Desirable
Record all inspections of haul routes and any subsequent action in a site log book.	Desirable
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Desirable

Operational Phase

- 6.160. The assessment has demonstrated that the Site will have negligible impacts and thus not significant effects on the local area.
- 6.161. The future users of the Site will not be exposed to air quality breaching the NAQO and will be compliant with the limit values. The overall effect of the Site will be “negligible”. It is, therefore, not considered necessary to propose further mitigation measures. However as there are exceedances of the NO₂, PM₁₀ and PM_{2.5} WHO AQGs there would be some benefit in installing NO₂ and particulate filters in the ventilation system of the building in the Site to at least work towards meeting the AQGs and achieve many of the interim objectives.
- 6.162. Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which was transposed into UK law). Furthermore, the government, the regional authority and the local authority are working on improving air quality under the relevant air quality Strategies and LAQM regime.

Cumulative Effects

- 6.163. Significant effects of the Site have been considered cumulatively with recently committed developments nearby.
- 6.164. The following nearby committed developments are identified in Table 6.19 along with their planning application references.

Table 6.19 - Approved Projects

Committed Development Name	Planning Reference
Manchester College	124995/FO/2019
Embankment West	17/70626/FUL
One Heritage Tower	19/74205/FULEIA
Greengate (Renaker)	19/74465/HYBEIA
New Victoria	111777/FO/2016/C1
Development at Mirabel Street and Great Ducie Street	12280/FO/2019

Committed Development Name	Planning Reference
Old Brewery Gardens	118831/FO/2018
4 Angel Square	123437/FO/2019
Angel Meadows	124120/JO/2019
Chapel Street Hotel	20/76134/FUL

Table Notes:

Some of these developments are found on Manchester City Councils planning portal and others are found on Salford City Councils planning portal.

- 6.165. The following traffic generation on roads near to the Site is expected as a result of the operation of each of the following approved projects:
- Greengate (Renaker) – 0.2% extra AADT on Great Ducie Street and 0.3% extra AADT on A6042.
 - New Victoria – 986 AADT on all roads near the Site.
 - Development at Mirabel Street and Great Ducie Street – 67 AADT on all roads near the Site.
 - Angel Meadows – 577 AADT on all roads near the Site.
- 6.166. All other committed developments resulted in no additional traffic generation or net negative traffic generation when compared with the existing site use so have all been considered as producing no additional trips.
- 6.167. The following combustion plants were identified on the two closest committed developments.
- Manchester College - 4 boilers.
 - Old Brewery Gardens - 10 boilers.
- 6.168. In the Air Quality ES Chapter for Old Brewery Gardens the highest predicted process contribution for the boilers predicted at any of the modelled receptors locations with the Old Brewery Gardens Development was 2.1 µg/m³. This represents a conservative value as the concentration experienced on the Site is likely to be lower than the highest modelled receptor within Old Brewery Gardens. In the Air Quality ES Chapter Appendix for Manchester College, the process contributions for the boilers were combined with the road emission contributions and the background concentrations within a contour. The highest contour line at the Site represented 26 µg/m³. Using a modelled concentration at receptor 8 (as discussed in paragraph 6.33) a worst case, highest process contribution for the boilers at the Site was calculated to be 5.5 µg/m³. These concentrations (7.6 µg/m³ in total) have been added to the road emission contributions and the background concentrations within Table 6.14.

Residual Effects

- 6.169. The residual effects of the Site on the local area and from the local area on the Site (after mitigation measures are applied) are presented in Table 6.20.

Table 6.20 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e Temporary/Permanent)
Construction Phase				
Indeterminate ^a Dust Soiling Effects on Local Sensitive Receptors	Approximately ten human receptors at commercial premises near the Site including a hotel	See Table 6.15 to Table 6.18	Construction contractors routinely implement such mitigation measures. Construction dust management plan recommended.	Negligible Effects – Temporary
Indeterminate ^a Dust Related Human Health Effects on Local Sensitive Receptors	Approximately ten human receptors at commercial premises near the Site including a hotel	See Table 6.15 to Table 6.18	Construction contractors routinely implement such mitigation measures. Construction dust management plan recommended	Negligible Effects - Temporary
Operational Phase				
Negligible Effects from Local Emission Sources on On-site Receptors	14 On-Site Receptors on the First and Second Floor Facades	None	N/A	Negligible Effects – Permanent
Negligible Effects from the Site Generated Emissions on Receptors in the Local Area	Sensitive Receptors near Roads leading from the Site (no specific receptors modelled)	None	N/A	Negligible Effects - Permanent

Table Notes:

a The construction dust effects are classed as indeterminate because the IAQM guidance does not recommend determining pre-mitigation effects as discussed in paragraph 6.145.

6.170. Residual effects at all considered receptor locations on-site and off-site during the construction phase and the operational phase are likely to be negligible.

Reference List

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

- British Geological Survey. (2021). UK Soil Observatory (UKSO). Retrieved from British Geological Survey: <http://mapapps2.bgs.ac.uk/ukso/home.html>
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- Ministry of Housing, Communities & Local Government. (2021d). National Planning Policy Framework.

- Public Health England. (2021). Public Health Outcomes Framework. Retrieved from <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>

Climate Change

Introduction

- 7.1. This Chapter of the Environmental Statement (ES) deals with two key aspects of the climate change agenda: mitigation of climate change via reducing Greenhouse Gas (GHG) emissions and adaptation to climate change.
- 7.2. An assessment of the likely significant effects of the Proposed Development with respect to GHG emissions and their effect on the climate is presented in the first Section below. This Section also describes the methods used to assess these effects, 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.
- 7.3. An assessment of the likely significant effects with respect to climate change adaptation in the implementation of the Proposed Development is presented in the second Section below. A climate change vulnerability assessment is legally required under the Climate Change Act 2008.
- 7.4. This Chapter is accompanied by one technical appendix, Climate Change Effects Carbon Assessment Results Summary (Appendix 7.1).
- 7.5. The Chapter has been prepared by Atkins. Details of the authors and qualifications are listed below:
 - Daniel George (Author)
 - BSc Environmental Science
 - Practitioner Member of IEMA (PIEMA)
 - Three years' experience
 - Ben Smith (Author)
 - PhD Geography
 - 14 years' experience on adaptation and resilience
 - Cristina West (Reviewer)
 - MSc Applied Environmental Economics
 - FCIWEM, C.Env.
 - Environmental Engineer with specialism in sanitary engineering
 - Over 30 years' experience

Climate Change Mitigation

Legislative and Policy Context

- 7.6. Human activities contribute to the emission of GHGs such as carbon dioxide (CO₂) to the atmosphere, primarily by the combustion of fossil fuels. Increased concentrations of GHGs trap heat in the atmosphere leading to increased global temperatures. Atmospheric CO₂ concentrations as of March 2021 were 417.14 parts per million (ppm) which are higher than expected levels in 2021 despite a temporary reduction in global emissions due to the COVID-19

pandemic during 2020. There is a global consensus that emissions must be reduced dramatically. Relevant national and local policies are cited below.

National Legislation and Planning Policy

Climate Change Act (2008) as amended in 2019

- 7.7. To support international efforts, the UK Climate Change Act (2008) set a legal GHG reduction target of 80% against 1990 levels by 2050. It also introduced a series of carbon 'budgets' for five-year periods, to act as stepping-stones to the overall reduction. There are budgets currently set up to 2037. In response to the ambitions of the Paris Agreement, in June 2019 the Climate Change Act was amended to set the overall reduction target by 2050 to at least a 100% reduction in net emissions against 1990 levels, i.e. 'net zero'. 'Net Zero' emissions mean that following all efforts to reduce emissions, the total of active removals of GHGs from the atmosphere offsets any remaining emissions from the rest of the economy. The removals are expected to be important given the difficulty in entirely eliminating emissions from some sectors.
- 7.8. The UK has so far outperformed its budgets. But progress is slowing, and the country is not on track to meet its future budgets or the overall reduction target, according to the 2021 Progress Report to Parliament by the Committee on Climate Change.

National Planning Policy Framework (NPPF) 2021

- 7.9. Paragraph 152 sets out that the planning system should support the transition to a low carbon future in a changing climate. It should help to: shape places in ways that contribute to radical reductions in GHG emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.
- 7.10. Paragraph 154 sets out that new development should be planned in ways that avoid increased vulnerability to the range of impacts arising from climate change and that can help to reduce GHG emissions, such as through location, orientation and design. It also states that any local requirement for sustainability of buildings should reflect the government's policy for national technical standards.
- 7.11. Paragraph 157 sets out that local planning authorities should expect the new development to comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant that this is not feasible. It also sets out they should expect the development to take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

- 7.12. The regulations require an assessment of the likely significant effects on climate of GHG emissions associated with proposed development.

Sub-Regional Planning policy

Climate Change and Low Emission Strategies' Whole Place Implementation Plan for Greater Manchester (2016-2020)

- 7.13. The plan sets out priorities to 2020 and beyond. It includes actions to both address climate change and improve Greater Manchester's air quality. The objectives extend beyond achieving a challenging 48% carbon reduction target (by 2020) to preparing the city region to adapt to unavoidable climate change, promoting carbon literacy and transitioning Greater Manchester (GM) into a low carbon and low emissions economy with clean air and sustainable lifestyles.

5 Year Environment Management Plan for Greater Manchester (2019-2024)

- 7.14. The plan identifies “the threat of climate change – reducing carbon dioxide (CO₂) emissions” as the most significant of environmental challenges. It highlights the need to make fair contribution to global commitments aimed at limiting global temperature rise. The vision statement includes neutral, climate resilient city region with a thriving natural environment and circular, zero-waste economy requirements with the aim for ‘mitigating climate change: For our city region to be carbon neutral by 2038 and meet carbon budgets that comply with international commitments’. The plan contains priorities around increasing the use of public transport and active travel modes and phasing out fossil-fuelled private vehicles.

Local Planning Policy

Manchester’s Local Development Framework – Core Strategy 2012-2027

- 7.15. Manchester’s Core Strategy includes four key policies relating to new development of low or zero carbon infrastructure and increasing decentralised energy supplies within the city. The policies set targets that new developments must meet as well as actions to follow that will decrease or negate the emissions resulting from new developments and increasing the energy resilience within the city by improving the level of decentralised energy supplies a new development must provide. The four policies within the Core Strategy are:
- Policy EN 4 – Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development;
 - Policy EN 5 – Strategic Areas for low and zero carbon decentralised energy infrastructure;
 - Policy EN 6 – Target Framework for CO₂ reductions from low or zero carbon energy supplies; and
 - Policy EN 7 – Energy Infrastructure opportunities.

Manchester City Council Climate Change Action Plan 2020-2025

- 7.16. Manchester’s ambition is to be a zero carbon city by 2038 or earlier – at least 12 years ahead of the national target. In July 2019, the Council declared a climate emergency, being one of the first councils in the UK to do so. The Council created a Climate Change Action Plan 2020-25 (for Manchester City Council) which translates that declaration into clear and measurable actions. The challenging target is to reduce the direct carbon emissions by a further 50% by 2025.

Manchester Climate Change Framework 2020-25

- 7.17. The Manchester Climate Change Framework 2020-25 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', a commitment in the Our Manchester Strategy 2016-25. It has been produced by the Manchester Climate Change Partnership and Agency.

Assessment Methodology and Significance Criteria

Guidance

- 7.18. The GHG assessment has been undertaken in accordance with the following guidance:
- IEMA (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance.

- BS EN 15978:2011 'Sustainability of construction works'.

Consultation Undertaken to Date

7.19. For this assessment no consultation has taken place to date.

Elements Scoped out of the Assessment

7.20. The following elements have been scoped out of the assessment and are shown in Table 7.1.

Table 7.0.1 Elements scoped out of the GHG assessment

Phase	Emission Sources	Reason for being Scoped Out
Demolition and Construction	Emissions from transboundary transport of materials to site and their associated upstream activities (well-to-tank emissions)	Supply chain is not yet decided so data are not available for source of materials.
	Emissions associated with powering inboundary construction plant	Design data not available for the construction activities.
	Emissions associated with the provision of water used onsite during construction	Design data not available for the construction activities.
	Emissions from the collection, treatment and disposal of solid waste	Design data not available for the construction activities.
Operation	Emissions associated with the provision of water used onsite during operation	The anticipated domestic water consumption is not yet known for the Project.
	Emissions from the collection, treatment and disposal of solid waste	The anticipated solid waste volume is not yet known for the Project.
	Emissions from the treatment of liquid effluent	The anticipated liquid effluent volume is not yet known for the Project.
End-of-Life	Emissions from the decommissioning of the site	The Proposed Development has no anticipated end-of-life date as the building can be refurbished and repurposed almost indefinitely. Therefore, emissions resulting from any potential End-of-life phase are unknown.

Source: Atkins analysis

Elements Scoped Into the Assessment

7.21. The following elements have been scoped into the assessment and are shown in Table 7.2.

Table 7.2 Elements scoped into the GHG assessment

Phase	Emission Sources	Data Sources
Demolition and Construction	Embodied CO ₂ e of construction materials, including emissions from raw material extraction through manufacture	Initial estimates of construction materials and quantities were obtained from the Design Team. Data on the following materials were available: • Structural components for Building A; • Structural components for Building B; • Landscaping materials (e.g. soil for lawn areas, asphalt); • Architectural features (e.g. façade, glazing); • Mechanical, Electrical, Plumbing (MEP); Emission factors were taken predominantly from Bath ICE 3.0 but also from Bath ICE 2.0 and individual manufacturers technical datasheets.
Operation	Building energy use	Estimated GHG emissions sourced from the Energy and Resources Statement. Please refer to this document for further details of calculation methodology.

Source: Atkins analysis

Study Area and Receptors

- 7.22. The study area for the assessment includes the site, all carbon emitting activities within the site and relevant carbon emitting activities beyond the site boundary that contribute to the total carbon footprint of the site area.
- 7.23. The atmosphere is the single, global receptor of GHG emissions. The value of the receptor does not change with the source of emissions and this assessment is based solely upon the magnitude of GHG emissions in the context of the baseline and efforts to reduce emissions nationally and locally.

Site Visits and Surveys

- 7.24. For the purpose of this assessment, no site visits or surveys were required.

Assessment Methodology

- 7.25. This GHG emissions assessment assesses the ability of the Proposed Development to enable or hinder the UK Government and Manchester City Council in meeting their stated carbon budgets against a business-as-usual scenario. The assessment estimates the scale and nature of GHG emissions during the construction and operational stages of the project life cycle.
- 7.26. The various emission sources included in scope are set out in Elements Scoped into Assessment above.
- 7.27. The amount of carbon that will be required to construct and operate the Proposed Development has been calculated using Atkins' Carbon Knowledgebase tool, which contains a detailed library of calculation formulae and over 1,000 emissions factors from authoritative sources such as the Inventory of Carbon and Energy (ICE, versions 1.6(a), 2.0 and 3.0), the Defra Greenhouse Gas Reporting Conversion Factors, and the EMEP/ CORINAIR Emission Inventory Guidebook.
- 7.28. In some cases, it has not been possible to conduct a full quantitative assessment as not all design data or construction plans are available at this stage of design (See Table 7.1).

Construction Stage

- 7.29. The data for the assessment has been provided by the design team and is up-to-date for this stage of the design.
- 7.30. A quantification of construction phase embodied carbon emissions (the emissions associated with the manufacture and use of the materials and equipment used in the construction phase) has been estimated using the carbon factors provided predominantly by Bath ICE 3.0 but also by Bath ICE 2.0 and from individual manufacturers technical datasheets. Bath ICE 3.0 / Bath ICE 2.0 carbon conversion factors were used to estimate emissions from various material and non-material sources under the following categories:
- Structural components for Building A;
 - Structural components for Building B;
 - Landscaping components;
 - Architectural components; and
 - Mechanical, Electrical, Plumbing (MEP) components;
- 7.31. At the time of writing this report, the data for construction processes mainly related to fuel, electricity and water use and business and employee transport are not available as the Project is in its early design stage. Once available, these data would need to be modelled and findings to be updated in this report.

Operation Stage

- 7.32. The Operational carbon emissions from the Proposed Development have been calculated using the Standard Assessment Procedure (SAP) and Simple Building Evaluation Method (SBEM). It is an analysis process used to accurately estimate the environmental impact and energy consumption of a dwelling / non-dwelling so it can be assessed and compared with other dwellings and against carbon budgets. SAP/SBEM quantifies a dwelling or building performance in terms of: energy use per unit floor area, a fuel cost based energy efficiency rating (the SAP rating and CO2 emissions. It takes into account the energy needed to provide space heating, lighting, domestic hot water and cooling systems as well as estimating the heat loss through construction material.

Significance of Effects

- 7.33. There is no accepted technical or policy guidance for determining a level of significance of the effect on climate of emissions from a development. There is also no legal limit for emissions for any one development, although there is global consensus that atmospheric warming should be kept to below 20C and the UK Government has set national carbon budgets to 2037 and an overall target for 2050.
- 7.34. The UK Government's carbon budgets (a cap on the amount of GHGs emitted in the UK over a five-year period) up to 2037 are shown in Table 1.3. The UK has so far outperformed its budgets, but progress is slowing, and the country is not on track to meet its future budgets or overall reduction target, according to the most recent Progress Report to Parliament by the Climate Change Committee.

Table 7.3 UK five-year carbon budgets

Budgetary Period	Carbon Budget (MtCO ₂ e)
1st carbon budget (2008 to 2012)	3,018
2nd carbon budget (2013 to 2017)	2,782
3rd carbon budget (2018 to 2022)	2,544
4th carbon budget (2023 to 2027)	1,950
5th carbon budget (2028 to 2032)	1,725
6th carbon budget (2033 to 2037)	965

Source: Climate Change Committee

- 7.35. The Tyndall Centre for Climate Research has calculated carbon budgets for each local authority in the UK for the period 2018 to 2100, in order for each to make a 'fair' contribution to overall UK national carbon reduction. The budget for Manchester City Council area is presented in Table 1.4. The combined carbon budget for the period 2018 to 2100 is 18.1 MtCO₂.

Table 7.4: Periodic Carbon Budgets for Manchester

Manchester Carbon Budget Period	Recommended Carbon Budget (MtCO ₂)
2018 – 2022	8.6
2023 – 2027	4.6
2028 – 2032	2.4
2033 – 2037	1.2
2038 – 2042	0.6
2043 – 2047	0.3
2048 – 2100	0.3

Source: Tyndall Centre for Climate Research

- 7.36. The emission of GHGs is certain to lead to a direct, long-term negative impact (global warming) on a highly sensitive and internationally significant receptor (the atmosphere). The effect is currently irreversible without significant technological development and will continue after the lifespan of the Proposed Development. These considerations apply to all emissions, generated from any source, in any location.
- 7.37. The level of significance of the impact (i.e. whether it is minor or moderate) is therefore based solely upon the magnitude of emissions generated. Compared with global and UK emissions, the magnitude of any single development of this type will always appear negligible. However, in its 2017 guidance document ‘Assessing Greenhouse Gas Emissions and Evaluating their Significance’ IEMA states that:
- “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.”*
- 7.38. With regards to assigning significance, the IEMA principles document provides a section on how to assess GHG emissions in EIA and states:
- “When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however, some projects will replace existing development that have higher GHG profiles. The significance of a project’s emissions should therefore be based on its net impact, which may be positive or negative...”*
- “Where GHG emissions cannot be avoided, the EIA should aim to reduce the residual significance of a project’s emissions at all stages.”*
- “Where GHG emissions remain significant, but cannot be farther reduced... approaches to compensate the project’s remaining emissions should be considered.”*
- 7.39. In the absence of being able to assign a significance level, IEMA further provides some guidance on contextualising a project’s GHG emissions:
- “Under the principle that all GHG emissions might be considered significant, and the ongoing research of how to actually measure significance, it is down to the practitioner’s professional judgement on how best to contextualise a project’s GHG impact. Generating a project’s carbon contribution will enable the impact of your project to be contextualised against sectoral, local or national carbon budgets. This will provide the practitioner and the LPA with a sense of scale.”*

- 7.40. As there is no accepted threshold for what magnitude of emissions is considered to have a significant effect on climate, professional judgement has been applied, considering local policy requirements, the scale of emissions compared with annual regional emissions, and whether the Proposed Development would have a significant impact on the UK's and Manchester City's ability to meet its emissions reduction targets and budgets.

Limitations and Assumptions

- 7.41. The key limitation of the assessment is the accuracy of the design information available to enable estimations. This may require assumptions to be made, and some industry standard data to be used as a proxy. The data and associated assumptions considered for the carbon emissions assessment are detailed below.
- 7.42. The following assumptions have been made during the carbon assessment:
- Carbon Factors are drawn from the Inventory of Carbon and Energy (ICE versions 1.6(a), 2.0 and 3.0) and individual manufacturers technical datasheets.
 - Operational energy consumption for the four retail units on the ground floor has not been estimated. This is because the occupancy of the retail units is not yet known.
 - To estimate the embodied carbon of all 445 apartments, each apartment has been assumed to be a standard 2-bed, 1 bathroom apartment.
 - All landscaping (softscape) features (ornamental planting, Sustainable Drainage System (SuDS) planting, shade tolerant lawn) are assumed to require soil to a 0.5m depth.
 - Steel within the structural units is assumed to be Rebar steel.
 - All Cement is assumed to be made up of 21% Granulated Blast furnace Slag (GGBS).
 - The Proposed Development will only provide electric vehicle charging spaces and no spaces for conventional vehicles.
 - The Proposed Development will start construction in 2023 and end in 2025.
 - The Proposed Development will complete handover at the end of 2025, with the first residents moving in in Q1 of 2026.

Baseline Conditions

UK Emissions

- 7.43. At the time of writing (November 2021), the UK is the world's eighth largest emitter of CO₂e, with the total background UK emissions for 2019 (the last reported year - 2019 UK GHG Emissions) being 454.8 million tonnes CO₂e.
- 7.44. The UK has in place carbon budgets for five-year periods up to 2037. The UK is currently in the third carbon budgetary period (2018-2022), the budget for which is 2,544 MtCO₂e. The UK cannot legally emit more GHGs than this within the budgetary period. The fourth carbon budget is 1,950 MtCO₂e (over the period 2023-27), the fifth budget is 1,725 MtCO₂e (2028-32), and the sixth carbon budget is 965 MtCO₂e (2033-37). Whilst budgets are not set beyond this, there is a legal requirement for the UK to reach 'net zero' emissions by 2050.

Regional Emissions

- 7.45. GHG emissions for Manchester City Council area have decreased from 3.3 MtCO₂e in 2005 to 2.0 MtCO₂e in 2019 (latest reported year; 2019 Local Authority Carbon Dioxide Emissions). In 2019, Transport and Domestic sectors were principally responsible for the area's emissions, accounting

for 35% and 30% of the total respectively, while Commercial accounted for 18% and Industry and Public both accounted for 9% each.

- 7.46. Considering the Manchester Tyndall Centre carbon budget of 18.1 MtCO₂ to 2100, Manchester City Council area will run out of budget in less than nine years' time at the current rate of annual emissions.

Site Specific Baseline Emissions

- 7.47. The site is currently a surface car park with ticketing machines and electronic barriers in place. These, along with the associated emissions from road vehicle users of the site are the only known sources of emissions from the site. Whilst not quantified, the emissions resulting from the ticketing machines and barriers at the site are expected to be negligible due to low energy consumption. The emissions resulting from road vehicle emissions at the site are also not quantified but again anticipated to be negligible compared to the UK's and MCC carbon budgets.

Future Baseline

- 7.48. In the absence of the Proposed Development, the potential alternative use of the site has not been indicated. If the land use and use of transport would remain unchanged, GHG emissions associated with the site would also remain unchanged. In this instance, this would be in relation to 192 surface level carparking spaces.

Impact Assessment

Construction

- 7.49. An initial, high level embodied carbon assessment has been carried out, based on preliminary estimates of building components. The estimated construction phase emissions due to embodied emissions for the Project are presented in Table 7.5. Emissions for construction phase activities are not available at the time of writing but are expected to contribute a significantly lower proportion of the Proposed Development's total emissions than embodied carbon emissions. The Proposed Development's overall emissions are anticipated to be higher than those detailed in Table 7.5 due to the missing elements of the assessment (See Table 7.1).
- 7.50. The construction phase of the Project is estimated to generate 17,550 tCO₂e emissions.

Table 7.5 Estimated Construction Phase carbon emissions

Component Category	Emissions (tCO ₂ e)
Structural	11,830
Landscape	80
Architecture	3,700
MEP	1,940
Total Emissions	17,550

Source: Atkins analysis

Operation

- 7.51. The total annual operational energy consumption for the Project is estimated to generate 357 tCO₂e of emissions during the first year that the Proposed Development is operational. This assumes that the current design proposal of 175m² of PV panels are installed on the top of Building B (covering approximately 11% of total roof space) with an estimated generation capacity of 36kWp. It also assumes all-electric space heating and domestic hot water generated by air source heat pumps, which will provide significant carbon savings.
- 7.52. There are no emissions from operational vehicles (i.e. resident-owned vehicles) as there are no conventional parking spaces within the Proposed Development.

- 7.53. Since the UK government is legally bound to reach Net Zero by 2050, the energy supply for the Proposed Development is anticipated to decarbonise until reaching Net Zero in 2050 or earlier. Therefore, it has been assumed that the Operational phase emissions will reduce at a steady rate in line with the anticipated decarbonisation of the grid energy supply until reaching Net Zero in 2050. This is reflected in Table 1.6 where the operational emissions reduce for each successive carbon budget.
- 7.54. Latimer Developments is committed to reducing the GHG emissions wherever practicable and to supporting the UK Government in meeting its carbon reducing targets. Table 7.6 shows the proportion of the relevant carbon budgets that the Project would contribute, multiplied over the 5-year budget period.

Table 7.6 Comparison of the Project emissions to UK Government Carbon Budgets

Project Stage	Estimated carbon emissions (tCO ₂ e)	Carbon budget period (UK Government carbon budget limit in brackets)		
		2023-27 (1,950,000,000 tCO ₂ e)	2028-32 (1,725,000,000 tCO ₂ e)	2033-37 (965,000,000 tCO ₂ e)
Construction	17,550	17,550	-	-
Operation	402 (during first operating year)	804*	1,676	1,257
Total		18,354	1,676	1,257
Percentage of project emissions in relation to UK Government carbon budget		0.00094%	0.000097%	0.00013%

* As the Proposed Development becomes operational in 2026, there are only 2 years of operational emissions in the 2023-27 budget.

Source: Tyndall Centre for Climate Research; Atkins analysis

Comparison to Manchester City Council's Carbon Budgets

- 7.55. Latimer Developments is committed to reducing the GHG emissions wherever practicable and to supporting Manchester City Council in meeting its carbon reduction targets. Table 1.7 shows the proportion of the relevant carbon budgets that the Project would contribute, multiplied over the 5-year budget period.

Table 7.7 Comparison of the Project emissions to Manchester City Council Carbon Budgets

Project Stage	Estimated carbon emissions (tCO ₂ e)	Carbon budget period (Manchester City carbon budget limit in brackets)					
		2023-27 (4,600,000 tCO ₂ e)	2028-32 (2,400,000 tCO ₂ e)	2033-37 (1,200,000 tCO ₂ e)	2038-42 (600,000 tCO ₂ e)	2043-47 (300,000 tCO ₂ e)	2048-2100 (300,000 tCO ₂ e)
Construction emissions	17,550	17,550	-	-	-	-	-
Operation emissions	402 (during first operating year)	804*	1,676	1,257	838	419	51

Total		18,354	1,676	1,257	838	419	51
<i>Percentage of project emissions in relation to Manchester City carbon budget</i>		0.40%	0.07%	0.10%	0.14%	0.14%	0.017%

*As the Proposed Development becomes operational in 2026, there are only two years of operational emissions in the 2023-27 budget.

Source: Tyndall Centre for Climate Research; Atkins analysis

- 7.56. In terms of Construction Phase emissions, the Proposed Development is estimated to generate emissions of an additional 17,550 tCO₂e. These are embodied carbon emissions only. Assuming that these emissions are generated in the UK, this would contribute 0.00094% to the 4th UK (2023-2027) carbon budget and 0.38% to the 2023-27 Manchester City carbon budget. Although emissions from the Construction Phase of the Project are not deemed to have a significant effect on climate if the 4th UK carbon budget is considered, these emissions could be significant in the context of the Manchester City carbon budget (as they represent c. 0.4% of the budget in 2023-27) if these emissions were generated within Manchester City territory. However, this is highly unlikely as materials are likely to be sourced from further afield or even internationally and therefore these emissions are unlikely to be significant.
- 7.57. In terms of Operational Phase emissions, the Proposed Development is estimated to generate emissions of an additional 402 tCO₂e emissions in the Opening year, with emissions decreasing as the energy supply decarbonises to Net Zero by 2050. Operational emissions are highly relevant in the context of carbon budgets.
- 7.58. Estimated operational emissions would contribute 0.000041% to the 4th UK (2023-2027) carbon budget, 0.000097% to the 5th UK (2028-2032) carbon budget and 0.00013% to the 6th UK (2033-2037) carbon budget. The estimated Operational Phase emissions would contribute 0.017% to the 4th (2023-27) Tyndall Centre Manchester City carbon budget. Estimated operational emissions would never contribute more than 0.14% of any of the following five Manchester City's carbon budgets up until 2100 (see Table 1.7). It is deemed that the Operational Phase of the Proposed Development would not have a significant effect on climate.

Mitigation Measures

- 7.59. Mitigation against effects on climate is the reduction in GHG emissions released in association with the project, both during construction and operation. The Proposed Development has been designed in accordance with the Local Authority's recommended energy hierarchy:
- Be Lean: Optimise form and orientation;
 - Be Mean: Energy efficient building fabric; and
 - Be Green: Use renewable energy source.
- 7.60. The approach to this is described in the Energy Statement prepared by Wallace Whittle.
- 7.61. Mitigation measures set out in Table 7.8 require consideration during the construction phase to reduce emissions resulting from construction activities. Several of the mitigation measures are already being considered by the Project Team.

Table 7.8 Construction emissions mitigation measures

Life Cycle Module		Mitigation Measures
Materials		Reduction of materials consumption should be carried out where possible. In addition, consideration should be given to alternative low carbon materials.
Transport		Materials transportation should be reduced and/or avoided by minimising the quantity of materials required. Materials should be transported to site via low and zero emissions freight when possible. Additionally, where possible detailed design and procurement measures should be specified to minimise the necessity to source materials from long distances.
Construction Processes	Construction plant use	All construction electricity should be purchased from renewable/low-carbon energy sources, and where possible renewable energy sources should be installed on site during construction works to reduce the consumption of energy required from the grid. Construction plant emissions should be minimised by designing for efficient construction processes as part of design development. During construction plant emissions should be managed via the Construction Environmental Management Plan (CEMP), which should specify plant operator efficiency requirements.
	Construction water use	Construction water consumption should be minimised by designing for efficient construction processes as part of design development. During construction mains water consumption should be managed via the Construction Environmental Management Plan, which should specify reduction and reuse measures.
	Construction waste transportation	Reduction of waste generation should be carried out in accordance with the mitigation measures outlined in the CEMP.
	Construction waste off-site processing	Waste treatment/disposal should be carried out in accordance with the mitigation measures outlined in the CEMP.
	Employee commuting	Local contractors should be used where possible, reducing the distance driven by employees.

- 7.62. Mitigation measures set out in Table 7.9 should be considered during the operation phase to reduce emissions resulting from operational activities. Several of the mitigation measures are already being considered / have been included in the design by the Project Team

Table 7.9 Operational emissions mitigation measures

Life Cycle Module		Mitigation Measures
Operational Energy	Residential energy use	All residential appliances should be electrical with no gas appliances installed. LEC lighting systems should be installed, with sensors in communal areas to limit the frequency of lights being unnecessarily left on.
	Commercial Unit energy use	All commercial unit appliances should be electrical with no gas appliances installed. LED lighting systems should be installed.
	Building heating	Each unit's design should consider the thermal envelope of the unit and identify ways to reduce heat loss from the Proposed Development. Heating systems should incorporate air source heat pumps to reduce the need for conventional heating and cooling.
	Renewable energy installation	Renewable energy sources (e.g. PV panels) should be installed at the property to provide low-carbon energy to the residential and commercial units.

Source: Atkins analysis

- 7.63. If incorporated, these mitigation measures would provide a significant saving beyond the Building Regulations Part L requirements for operational energy consumption.
- 7.64. No further mitigation measures have been identified at this stage.

Cumulative Effects

- 7.65. The effects of GHG emissions are essentially cumulative; it is their concentration in the atmosphere, not the actual level of emissions, that determines the warming effect (i.e. it is the 'stock' rather than the 'flow' which is important). In addition, it is the global excess of emissions from human activities all over the world that contributes to the overall effect on climate, not only local emissions. For this reason, the impact of the Project should be considered in the context of overall emissions from the UK and globally. Compared with global emissions, the scale of the cumulative impact of the Project is negligible. However, the overall effect on climate of GHG emissions is made up of many small emissions sources, of which this project would contribute, and it is the role of the consenting authority to ensure that local carbon budgets are not breached through an accumulation of emissions due to small individual sources.

Residual Effects

- 7.66. Due to the embedded nature of the mitigation measures proposed, some of which have already been incorporated into the design (for example, PV panels on roof) and some of which are yet to be incorporated, it is not practicable to complete a quantitative assessment of 'before' and 'after' mitigation. Rather, the assessment shows a snapshot of the current design.
- 7.67. The likely residual effects of the Proposed Development are shown in Table 7.10. Any mitigation measures will decrease the carbon emissions emitted to the atmosphere as a result of the Proposed Development. **Negligible, non-significant** residual effects are expected on the climate and these effects will not affect the ability of the UK Government and MCC's to meet their carbon budgets.

Table 7.10 Summary of Residual Effects of the Proposed Development

Likely Significant Effect	Receptor(s)	Proposed Mitigation Measure(s)	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e Temporary/Permanent)
Construction Phase				
Negligible, non-significant effect on climate (compared with UK emissions)	Atmosphere	Table 1.8	Through design changes to Proposed Development, setting up of supply chain, and implementation of construction processes	Negligible, non-significant effects on climate (compared with UK and Manchester City emissions)
Operational Phase				
Negligible, non-significant effect on climate (compared with UK emissions)	Atmosphere	Table 1.9	Through design changes to Proposed Development	Negligible, non-significant effects on climate (compared with UK and Manchester city emissions)

Source: Atkins analysis

Summary

- 7.68. In terms of Construction Phase emissions, the Project is estimated to generate emissions of an additional 17,550tCO₂e. These are embodied carbon emissions only. Assuming that these emissions are generated in the UK, this would contribute 0.00094% to the 4th UK (2023-2027) carbon budget and 0.38% to the 2023-27 Manchester City carbon budget. Although emissions from the construction phase of the Project are not deemed to have a significant effect on climate if the 4th UK carbon budget is considered; these emissions could be significant in the context of the Manchester City carbon budget (as they represent c. 0.4% of the budget in 2023-27) if these emissions were generated within Manchester City territory. However, this is highly unlikely as

materials are likely to be sourced from further afield or even internationally and therefore these emissions are unlikely to be significant in this context.

- 7.69. In terms of Operational Phase emissions, the Proposed Development is estimated to generate emissions of an additional 402 tCO₂e emissions in the Opening year, with emissions decreasing as the energy supply decarbonises to Net Zero by 2050. Operational emissions are highly relevant in the context of carbon budgets as they occur in territory.
- 7.70. Operational emissions would contribute 0.000041% to the 4th UK (2023-27) carbon budget, 0.000097% to the 5th UK (2028-32) carbon budget and 0.00013% to the 6th UK (2033-38) carbon budget. The Operational Phase emissions would contribute 0.017% to the 4th (2023-27) Tyndall Centre Manchester City carbon budget. Operational emissions would never contribute more than 0.14% of any of following five Manchester City's carbon budgets up until 2100 (see Table 1.7). It is deemed that the operational phase of the Proposed Development would not have a significant effect on climate.

Adaptation to Climate Change

Introduction

- 7.71. Climate related impacts are already being recorded in Manchester and climate projections released by the UK Climate Impacts Programme (UKCIP) suggest that these will, in the absence of appropriate adaptation measures, become more frequent.
- 7.72. The main objective of this Climate Change Vulnerability Assessment is to ensure that the Proposed Development is suitably resilient to the impacts of climate change over its lifetime.

Legislative and Policy Framework

- 7.73. The following legislation and policies govern assessment of vulnerability to climate change and have been referenced in preparing this chapter, with the relevant portions summarised in 7.11.

Methodology

- 7.74. This Climate Change Vulnerability Assessment follows an assessment framework, which includes:
- Assessment of relevant climate hazards for the proposed development;
 - Review of climate projections for Manchester;
 - Assessment of adaptation measures included in the design of the Proposed Development; and
 - Assessment of residual risk to the Proposed Development based on the adaptation measures incorporated.

Baseline Conditions

- 7.75. There have been a series of recent significant current climate events across the city of Manchester.¹ The city's residents and businesses are seeing more frequent flash flooding, travel disruptions, health impacts from poor air quality and extreme heat episodes in the summer.² A summary is provided below by event type across relevant periods and specific locations.

¹ <https://www.manchesterclimate.com/sites/default/files/Climate%20vulnerability%20framework.pdf>.

² <https://democracy.manchester.gov.uk/documents/s16275/Final%20MCC%20Climate%20Change%20Action%20Plan%202020-25.pdf>.

Floods

- 7.76. In the past decade, Manchester has experienced several notable floods. Storm Christoph in January 2021 threatened flooding in Didsbury and Northenden, with reports that the flood defences in the area were close to over-topping in places.^{3 4}
- 7.77. Significant flooding occurred across Greater Manchester in December 2015. Across the city region 2,225 properties were internally flooded. In Manchester, 37 properties were internally flooded in Cheetham and Hendham Vale.⁵

High Temperature Events and Heat Waves

- 7.78. In 2018 Manchester, along with other parts of the UK, experienced a prolonged period of drought. Throughout the summer, moorlands across several parts of the country suffered a series of wildfires, with two wildfires on Saddleworth Moor in Greater Manchester, lasting for three weeks, damaging the peatland. The event caused a significant decline in air quality across Manchester and Greater Manchester.^{6 7 8}
- 7.79. Previous heatwaves have been recorded in 2006 and 2013.

Elements Scoped in and out of the Assessment

- 7.80. There are a number of climate hazards that can impact on residential and commercial developments. Table 7.12 highlights potential impacts on buildings, and highlights those which have been scoped into the assessment during the scoping stage of the EIA, namely: flooding (fluvial and pluvial), extreme heat, and water scarcity.

Table 7.12 – Climate hazards scoped in and out of the assessment.

Climate hazard	Rating	Explanation
Water Scarcity	Scoped In	Housing developments can be vulnerable to public water supply/demand deficits. Higher temperatures can increase public demand for water while dry periods can affect regional supply. Climate change (increasing temperatures and changes in precipitation patterns) and population growth can also put pressure on water resources. Water shortages can also impact buildings services and maintenance, including landscape management.
Flooding (pluvial)	Scoped In	Heavy and/or prolonged rainfall can produce large volumes of surface water that can overwhelm drainage and sewer infrastructure. Surface water (pluvial) flooding can cause loss of life, injury and ill health, damage to buildings and structures, and disruption to critical infrastructure.
Flooding (fluvial)	Scoped In	The impacts of fluvial flooding can be severe and felt for months and years after the event, in particular on health, wellbeing, livelihoods and social cohesion. Even after floodwater has retreated, flooding increases the risk of mould and can be linked to increases in respiratory diseases.
Extreme temperature events	Scoped In	Excessive outdoor temperatures can affect thermal comfort and building materials and design can also enhance or reduce this effect.
Solar radiation	Scoped Out	Prolonged exposure to solar radiation and temperature extremes can cause damage to the building envelope, building services, fixtures and fittings due to the expansion, buckling and stresses of structures and surfaces and the failure of building services. This element has been scoped out based on location.

³ <https://www.greatermanchester-ca.gov.uk/media/1261/boxing-day-flood-report.pdf>.

⁴ <https://www.manchestereveningnews.co.uk/news/greater-manchester-news/threat-life-warning-didsbury-northenden-19667955>.

⁵ <https://www.manchestereveningnews.co.uk/news/greater-manchester-news/mancunian-way-hole-closed-flooding-9858840>.

⁶ <https://www.theguardian.com/uk-news/2018/jun/27/saddleworth-moor-wildfire-army-called-in-to-tackle-fire>.

⁷ <https://www.bbc.co.uk/news/uk-england-lancashire-44853173>.

⁸ <https://www.manchesterclimate.com/sites/default/files/Climate%20vulnerability%20framework.pdf>.

Climate hazard	Rating	Explanation
Storms and high winds	Scoped Out	High winds and storms (including lightning and snow) can also cause damage to the building envelope, building services, fixtures and fittings. This element has been scoped out.
Soil stability and subsidence	Scoped Out	Drought and reductions in soil moisture content can cause soil shrinkage and subsidence. Subsidence can cause localised but major damage to buildings and infrastructure. Although clear potential for damage this element has been scoped out based on site location and characteristics.

Summary Climate Projections for Manchester

- 7.81. Minimum, maximum and average temperatures will all increase, with a greater rate of increase in summer maximums than winter maximums. Under a high emissions scenario the hottest temperatures experienced could increase 5-6°C by the end of the century compared to current conditions.
- 7.82. Winter rainfall is likely to increase in the range of 20-30%, while summer rainfall is likely to decrease by around 20-40%.
- 7.83. Floods: There is likely to be significant increase in rainfall intensity leading to more frequent and larger river flooding, as well as an increase in surface water flooding resulting from intense rainfall events.
- 7.84. Drought: There could be twice as many hydrological droughts (duration of low river flows) by the end of the century, which has potential impacts on public water supply and the environment.

Impact Assessment

- 7.85. The Strategic Flood Risk Assessment carried out for Manchester confirms that the site of the Proposed Development lies in Flood Zone 2, which classifies it as at Medium risk of Fluvial Flooding, with between a 1-in-100 and 1-in-1000 annual probability of flooding.
- 7.86. The Flood Risk Assessment for the Proposed Development has applied Environment Agency guidance to determine the appropriate climate change allowance to be applied on top of the level of the current 1-in-100 year flood for the River Irwell, resulting in an additional 30% allowance for commercial units on the site, and a 70% allowance for essential infrastructure such as substations. As such the minimum floor levels set out in the design have been designed to be resilient to increases in peak flood magnitude over the lifetime of the development. Additionally, there is a requirement for flood-resilient construction techniques to be used up to the level of the 1-in-1000 year flood, conferring additional protection.
- 7.87. The site is located in an area at risk from groundwater flooding. Although groundwater flooding poses limited risk to life, it can cause damage to the building, in particular if key services are located in basements. The Flood Risk Assessment carried out states that appropriate mitigation measures for groundwater flooding will be put in place during detailed design.
- 7.88. There is a small area of the site which is highlighted as being in an area of Low Risk for pluvial (surface water) flooding, where there is a local depression and gullies onsite. The site design addresses the risk of pluvial flooding in two ways: reprofiling to remove the existing gullies, and by ensuring that site drainage design can accommodate a 1-in-100 year rainfall event, with additional allowances for climate change to address increases in rainfall intensity. As such there is low risk to the development following the adaptation measures incorporated into the design.
- 7.89. SuDS features have also been included within the landscaping for the courtyard to enhance surface water drainage and reduce both onsite flood risk, and the export of flood risk beyond the boundary of the Proposed Development.

- 7.90. Health impacts stemming, in particular, from extreme heat, are addressed through health and wellbeing measures. The building itself is equipped with ventilation, as dwellings will be carefully designed to avoid overheating. This will be done without reliance on Mechanical Ventilation Heat Recovery (MVHR) where possible and with either natural or mechanical ventilation to the communal areas.
- 7.91. An overheating study was commissioned, the findings of which indicated that all rooms analysed were compliant with the CIBSE TM59 methodology for assessing the risk of overheating in homes. The TM59 methodology incorporates UKCP09 climate projection data. However, it does not appear that the overheating assessment has assessed more recent projections, and climate change is not explicitly discussed in the report. It is possible that the assessment may underestimate overheating risk from more extreme future heatwaves.
- 7.92. Green spaces are recognised as vitally important to wellbeing and healthy living and have a role to play in adapting to climate impacts. The Proposed Development incorporates a landscaped courtyard with a number of trees and green spaces accessible to the public and a walking route through the site. These will provide a cooling effect and shading during hotter days.
- 7.93. The risk of water scarcity is addressed through the internal water efficiency measures taken on by the Proposed Development.

Adaptation Measures

- 7.94. The Proposed Development incorporates a number of measures to ensure that it is resilient to the impacts of climate change, as detailed above. Key adaptation measures include:
- Incorporation of climate change allowances for fluvial flood risk into the design, specifying minimum floor height, and flood resilient design.
 - Incorporation of climate change allowances for heavy rainfall into the drainage design for the site
 - Use of SuDs features within landscaping to reduce surface water run-off.
 - Incorporation of green spaces at the site at Boddingtons for both cooling and attenuation of runoff.
 - Internal water efficiency measures; and
 - Building ventilation to avoid overheating.
- 7.95. Table 7.13 summarises the residual risks considering the adaptation measures against the initial risk profile. The adaptation measures identified will provide resilience against the climate impacts on the development. No further adaptation measures are required at this stage.

Summary

- 7.96. In terms of climate-related hazards, flooding, water scarcity and extreme heat are considered relevant to the Proposed Development. In the past decade, Manchester has experienced several notable floods and frequent heatwaves. Flooding can have significant negative economic impacts such as loss of lives and property, loss of livelihoods and loss of productivity. Water scarcity may limit access to safe water for drinking and for practising basic hygiene at home. Heatwaves are particularly impactful on the elderly, very young and people with underlying conditions. Such events and their increased frequency have been considered in the assessment. Suitable adaptation measures have been considered by the developer in the design to address the identified relevant climate risks which will reducing the residual effects and residual significance to **non-significant** (see Table 7.13).

Table 7.13 - Potential operational impacts on asset receptors

Climate hazard	Potential impact	Adaptation measures	Residual Risk	Significance
Flooding	Pluvial and fluvial flooding could affect integrity of buildings and cause loss of life	- Building design includes appropriate EA allowances for fluvial flood risk, given site and development characteristics - Landscaping of site reduces pluvial flood risk, and drainage system design includes climate change allowances.	Low	Not significant
Water scarcity	Potential water supply limitation during severe droughts	Internal water efficiency measures	Low	Not significant
Extreme heat	Overheating of buildings, with particular health effects on elderly and vulnerable residents	- Building ventilation incorporated to avoid overheating - Green spaces and a landscaped courtyard	Low	Not significant

Reference List

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

- Atmospheric CO2 levels in 2021:
<https://www.metoffice.gov.uk/research/news/2021/record-co2-levels-despite-lower-emissions-in-2020>.
- Climate Change Act 2008: Climate Change Act 2008 ([legislation.gov.uk](https://www.legislation.gov.uk)).
- Infrastructure Planning (EIA) Regulations 2017: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ([legislation.gov.uk](https://www.legislation.gov.uk)).
- 2021 Progress Report to Parliament: 2021 Progress Report to Parliament - Climate Change Committee ([theccc.org.uk](https://www.theccc.org.uk)).
- NPPF 2021:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf.
- University of Bath Sustainable Energy Research Team (2010), Inventory of Carbon and Energy Version 3.0: Embodied Carbon Footprint Database - Circular Ecology.
- The Town and Country Planning (EIA) Regulations 2017:
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Daylight and Sunlight

Introduction

- 8.1. This Chapter of the ES has been prepared by GIA and assesses the likely daylight, sunlight and overshadowing 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.
- 8.2. This assessment and ES chapter has been produced by GIA and is supported by the following technical results within Appendix 8.1:
 - Appendix 8.1 – Drawings of the Baseline and Proposed Scenario;
 - Appendix 8.2 – Daylight and Sunlight Results for Baseline v Proposed;
- 8.3. This Chapter of the ES was written by Michael Beatty BSc (Hons) MRICS. Michael is a chartered surveyor with six years' experience specialising in daylight and sunlight. GIA are the largest specialist daylight and sunlight advisor in the UK, with over 28 years of specialisation and expertise, having advised on some of the largest developments within Greater Manchester.

Legislative and Policy Context

National Planning Policy

Revised National Planning Policy Framework 2021

- 8.4. Paragraph 130 of the National Planning Policy Framework stipulates that "...Planning policies and decisions should ensure that developments... 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."
- 8.5. Paragraph 125 further states:

"Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities, and ensure that developments make optimal use of the potential of each site. In these circumstances:

[...]

c) when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."

The National Planning Practice Guidance (NPPG)

- 8.6. The National Planning Practice Guidance (NPPG) – Efficient Use of Land, published on 22 July 2019, Paragraph: 006 Reference ID: 66-006-20190722 states that:

"Where a planning application is submitted, local planning authorities will need to consider whether the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing whether daylight and sunlight within the development itself will provide satisfactory living conditions for future occupants."

8.7. Paragraph 007 Reference ID: 66-007-20190722 also states:

"All developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design. For example in areas of high-density historic buildings, or city centre locations where tall modern buildings predominate, lower daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings."

Local Planning Policy

Manchester Core Strategy (2012 – 2027)

- 8.8. Policy DM1 – Development Management – States that all developments should have regard to the effects on amenity including privacy, light, noise, vibration, air quality and odours.
- 8.9. Policy EN2 – Tall Buildings – States that, by their very size, tall buildings can have a significant impact on the local environment and its micro-climate. It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment.

Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (Adopted April 2007)

- 8.10. The SPD sets out a series of design principles which should be considered and implemented where necessary, those measures relevant to this assessment are:
- Minimise reliance on energy-using equipment for heating, cooling, lighting and natural ventilation.
 - Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in the summer.
 - Consider the impacts of overshadowing.

Guidance Documents and Standards

Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition, 2011

- 8.11. The Building Research Establishment (BRE) Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011, 2nd edition' (released October 2011) provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them. It is intended for use by building designers, developers, consultants and Local Planning Authorities (LPAs). The advice it gives is not mandatory and should not be used as an instrument of planning policy, it states:

"This guide is a comprehensive revision of the 1991 edition of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."

- 8.12. It also states:

"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. In special circumstances the developer or planning authority may wish to use different target values... in an area with modern high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings" (para.1.6).

- 8.13. In addition, the BRE Guidelines state (para. 1.3) that, “it is intended to be read in conjunction with the interior daylighting recommendations in the British Standard 8206-2 Code of practice for daylighting, and in the CIBSE publication Lighting guide: daylighting and window design”.

British Standard (BS) 8206-2:2008: ‘Lighting for Buildings – Part 2: Code of Practice for Daylighting’

- 8.14. The British Standard 8206 part 2 provides recommendations regarding the design for daylight in buildings and sets out various methods for assessing daylight. The document states:

“Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users.”

EN17037:2019 Daylight in Buildings (December 2018)

- 8.15. The new European Standard for Daylighting, or EN17037 was published in December 2018. Most local authorities continue to refer to the BRE guidelines. The BRE hoped to secure funding and re-write the BRE guidelines in the financial year beginning April 2019, with the view of a revised publication in 2020, although this did not materialise. There is a fair degree of ambiguity as to when the new European Standard will become part of planning policy and what the transition between standards will be. In the meantime, The BRE guidelines and BS8206 remain the relevant tests.

Assessment Methodology and Significance Criteria

Methodology for Determining Baseline Conditions and Sensitive Receptors

- 8.16. The BRE Guidelines suggest that residential properties have the highest requirement for daylight and sunlight and states that:
- “the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms.”*
- 8.17. The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the Proposed Development.
- 8.18. The following properties are defined as sensitive receptors and will be considered due to their proximity to the Site, and their residential use:
- Old Brewery Gardens (118831/FO/2018)
 - Travelodge
- 8.19. These properties are identified in the drawings contained at Appendix 1.1.
- 8.20. The assessment has considered other adjacent residential properties and due to the distance and orientation from the Proposed Development, they are unlikely to be affected, so they have not been assessed in detail.
- 8.21. There are no amenity areas located in close proximity to the Site. As such, no overshadowing assessment of surrounding amenity areas is required.

Scenarios Assessed

- 8.22. The following scenarios have been assessed and are reported within this Chapter of the ES:
- Baseline configuration (pre-development); and

- Proposed Development

- 8.23. Where consented schemes have the potential to be affected by the Proposed Development or cause cumulative impact to the existing surrounding residential buildings, these have been included in the baseline scenario and assessed individually in detail, so no separate technical assessment of the cumulative impact is required. This approach is in line with the BRE Guidelines.
- 8.24. The Baseline scenario considers the current baseline condition (as can be seen in November 2021). This scenario is depicted on drawing nos. 1474/01-03 (Appendix 8.1).
- 8.25. The Proposed Development is illustrated on drawing nos. 1474/04-06 (Appendix 8.1).

Methodology for Determining Demolition and Construction Effects

- 8.26. Owing to the evolving and changing nature of demolition and construction activities, the assessment of potential effects during demolition and construction of the Proposed Development on daylight and sunlight to surrounding properties has not been modelled.
- 8.27. Since the potential daylight and sunlight effects relating to demolition and construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed Proposed Development, the interim construction effects are not assessed quantitatively as it is considered that the completed Proposed Development represents the worst case assessment in terms of likely daylight and sunlight impacts.

Methodology for Determining Operational Effects

- 8.28. The following approaches are undertaken to assess the effect on the sensitive receptors of surrounding properties when the Proposed Development is completed and operational:
- Daylight
 - Vertical Sky Component (VSC); and
 - No Sky Line (NSL) Method.
 - Sunlight
 - Annual Probable Sunlight Hours (APSH).

Outline Approach for Daylight, Sunlight and Overshadowing Assessments

- 8.29. The technical analyses carried out to inform the daylight and sunlight assessment have been undertaken by creating a digital three-dimensional (3D) model of the existing Site and Proposed Development, based on measured survey data.
- 8.30. The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings and thus calculate the sunlight in each scenario.
- 8.31. In accordance with the BRE Guidance, only those surrounding properties which have windows facing towards the Site were included in the assessment. If a nearby property has no windows facing the Site, these properties would not be affected by the Proposed Development in terms of light.

Daylight

Vertical Sky Component (VSC) Method

- 8.32. The VSC method of assessment is defined in the BRE Guidelines as the:
- “ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky”.*
- 8.33. This ratio is the percentage of the total unobstructed view that is available, once obstructions (e.g. the Proposed Development), are placed in front of the point of view.
- 8.34. The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings. The VSC has been calculated using a 'Waldram Diagram'.
- 8.35. The Waldram Diagram is effectively a snapshot taken from that point of the sky in front of the window, together with all relevant obstructions to it, i.e. the buildings. For calculation purposes, trees may be ignored unless they form dense continuous belts.
- 8.36. Due to the limitations of peripheral vision, the maximum VSC value is almost 40% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:
- “if the VSC, with the development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window may appear more gloomy and electric lighting will be needed more of the time”.*

No Sky Line (NSL) Method

- 8.37. The BRE Guidelines provide that where room layouts are known, the effect on the daylight distribution can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information is not available.
- 8.38. The NSL method is a measure of the distribution of daylight at the 'working plane' within a room. The 'working plane' means a horizontal 'desktop' plane 0.85m in height for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room will be poor and supplementary electric lighting may be required.
- 8.39. The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although the BRE state that they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its baseline value, then this would be noticeable to its occupants.
- 8.40. BS 8206 Part 2 states (para 5.7) that the:
- “uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no sky line”.*
- 8.41. Therefore, it is implied that an NSL of at least 80% would be considered satisfactory.
- 8.42. In regard to deep rooms which are lit by windows on one side, the BRE Guidelines state (para. 2.2.10):
- “If an existing building contains rooms lit from one side only and greater than 5m deep, then a greater movement of the no sky line may be unavoidable.”*

Sunlight

Annual Probable Sunlight Hours

- 8.43. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists the total annual probable sunlight hours would amount to 1392, and each spot equates to 13.92 hours of the total annual sunlight hours.
- 8.44. The number of spots is calculated for the Baseline and Proposed Development scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each of the time periods for each window assessed.
- 8.45. The BRE Guidelines note that:
- "In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon."*
- "all main living rooms of dwellings...should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun".*
- "If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked."*
- "...a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day".*
- 8.46. In regards to existing surrounding receptors, the BRE Guidelines provide that a window may be adversely affected if a point at the centre of the window receives less than 25% of the APSH, including at least 5% of the APSH during the winter months (21 September to 21 March), or less than 0.8 times its baseline sunlight hours during either period, or if there is a reduction in total APSH which is greater than 4%.
- 8.47. BS 8206 Part 2 (section 5.2) states that:
- "Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight as from its excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day."*
- "Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points."*
- 8.48. As is often the case, it is not possible to determine the room uses within each of the neighbouring properties, nor is it clear which window should be considered as the 'main windows'. Therefore, unless the rooms use is known through plans, all the rooms with windows facing the Site and within 90 degrees of due south have been considered in the assessment. Windows that do not face within 90 degrees of due south do not have a realistic expectation of direct sunlight, due to their orientation and the sunlight path in the northern hemisphere.

Summary of Criteria for Daylight and Sunlight

- 8.49. The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 8.1— Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times its former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year, less than 25% of the APSH including at least 5% of the APSH during the winter months (21 September to 21 March) and less than 0.8 times its former sunlight hours during either period, and for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%.

Significance Evaluation Methodology

Daylight and Sunlight Magnitude of Effect

- 8.50. For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying appendix, in terms of assigning criteria to assess the effects:

“Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required...The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.”

“Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.”

“Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- Only a small number of windows are affected;
- The loss of light is only marginally outside the guidelines;
- An affected room has other sources of skylight or sunlight; and
- The affected building only has a low level of requirement for skylight or sunlight.”

- 8.51. The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

“Factors tending towards a major adverse impact include:

- a large number of windows are affected;
- the loss of light is substantially outside the guidelines;
- all the windows in a particular property are affected; and
- the affected indoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling”.

Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building. Beneficial impacts should be worked out on the same principals as adverse impacts.”

- 8.52. The BRE Guidelines do not provide any guidance on what constitutes a moderate adverse impact.

- 8.53. Therefore, best practice guidance and professional judgment has been used to determine any impacts based on the guidance set out in Appendix I of the BRE Guidelines. Potential effects are identified as beneficial, adverse or negligible, and their magnitude of effects are set out as Minor, Moderate and Major.
- 8.54. The initial numerical criteria for determining the magnitude of effect is based on percentage alterations, as follows:

Table 8.2 – Daylight & Sunlight Magnitude of Effect

Magnitude of Effect	Percentage Alteration from Baseline
Negligible	0-20%
Minor	20-29.9%
Moderate	30-39.9%
Major	40%+

Sensitivity of Identified Receptor

- 8.55. It is important that the location and nature of the Site and surroundings are considered when determining the significance of any impacts identified. The BRE Guide is very clear that the targets provided are not mandatory. The location of the Proposed Development could be deemed to be special circumstances in which the planning authority may wish to use different target values. This scope and view should also be followed through to the sensitivity of the surrounding receptors. There should be an expectation that a higher degree of obstruction is inevitable in an area with modern high-rise buildings. This point is also made in the NPPF and NPPG.
- 8.56. For these reasons, the surrounding receptors may have a lower sensitivity to change in an urban location than those located in sub-urban, less dense areas. Sensitivity classification is assigned on how the proposed receptor is able to accommodate or adapt to the effect of the development. The existing residential receptors surrounding the Site reside in a city centre location where there is an expectation for a higher density of development. The Site is currently cleared, meaning it is underdeveloped and unusually open aspect given the city centre location.
- 8.57. Travelodge is a hotel so, despite being residential use, it is a commercial building. As such, it is considered as having a low sensitivity to change.
- 8.58. Old Brewery Gardens is not yet constructed, so there are no residents in occupation to notice any changes in light. As such, it is also considered as having a low sensitivity to change.

Significance of Effects

- 8.59. The significance of any identified environmental effects is determined by the assessment of their magnitude against their sensitivity. The table below illustrates how the sensitivity of the receptors and the magnitude of any effect combine to confirm significance.

Table 8.3 – Significance of Effect

Magnitude	Sensitivity High	Medium	Low
Major	Major Adverse / Beneficial*	Major Adverse / Beneficial*	Moderate Adverse / Beneficial
Moderate	Moderate Adverse / Beneficial*	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
Minor	Minor Adverse / Beneficial	Minor Adverse / Beneficial	Negligible
Negligible	Negligible	Negligible	Negligible
Key	*Significant in terms of EIA regulations		

- 8.60. When assigning significance criteria for daylight and sunlight effects, professional judgement has been used. Consideration has been given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, sensitivity of the receptor, and any other relevant factors. There may be mitigating factors such as location and nature of development, balconies, overhangs or design features which may also affect the determination of assigning the criteria.

Limitations and Assumptions

- 8.61. Where actual room layouts were available on the planning portal, these have been considered when modelling the internal layouts within the existing surrounding properties. Where layout information was not available, assumptions have been made as to the use and internal configuration of the rooms (from external observations during a site inspection) behind the fenestration observed.
- 8.62. In such cases a standard 4.2 metre (m) (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL).
- 8.63. Floor levels have been assumed for adjoining properties assessed, where access has not been obtained. This dictates the level of the working plane which is relevant for the NSL assessments.

Baseline Conditions

Daylight & Sunlight

- 8.64. The full Baseline Daylight and Sunlight results can be found in Appendix 8.2 and are summarised in Table 8.4 below.
- 8.65. A total of 638 windows facing the Site serving 527 rooms within two buildings were assessed for VSC and NSL for daylight and 24 rooms were assessed for APSH for sunlight within one building.
- 8.66. Out of the 638 windows assessed for daylight, 496 (78%) meet the BRE guidelines for VSC. For NSL, 443 (84%) of the 527 rooms assessed meet the BRE criteria. For sunlight, 23 (96%) of the 24 rooms assessed meet the BRE criteria for both Winter and Annual APSH.
- 8.67. Overall, this baseline scenario is considered a high level of compliance due to the city centre context of the Site.
- 8.68. The Site is underdeveloped in context to its city centre location, and is therefore unusually open aspect, which contributes to higher baseline results to the surrounding receptors.

Table 8.4 – Baseline Daylight and Sunlight results to surrounding sensitive receptors

Address	Total No. Windows That Meet VSC Criteria		Total No. of Rooms That Meet NSL Criteria		Total no. of Rooms That Meet APSH Criteria	
	Pass	Total	Pass	Total	Pass	Total
Old Brewery Gardens	451	537	380	426	23	24
Travelodge	45	101	63	101	N/A	N/A
Total	496	638	443	527	23	24

- 8.69. The assessment of baseline levels to the surrounding properties considers whether a window/room already meets the BRE criteria in the existing scenario only, whilst the BRE guide states that a window/room should not be reduced by any more than 0.8 times its former value (a 20% reduction) in the proposed scenario. As such, as the VSC target is 27%, if a window in the baseline has 25% VSC, it will be classed as not meeting the BRE targets. In the proposed scenario, if the same window is reduced to 24%, it will be classed as meeting the VSC target as it is within

0.8 times its former value. Therefore, some windows/rooms may not meet the target criteria in the baseline but will in the proposed scenario.

Identification and Evaluation of Significant Effects

Daylight to Surrounding Sensitive Receptors

- 8.70. The full Proposed Development daylight results can be found within Appendix 8.2 and are summarised in Tables 8.5 and 8.6 below.
- 8.71. A total of 638 windows serving 527 rooms were assessed for daylight within two buildings considered to be sensitive receptors.
- 8.72. The breakdown of the baseline results against the Proposed Development for each of the individual buildings forming part of this assessment are discussed in more detail below.

Table 8.5 – Summary of VSC Daylight Results

Address	VSC				
			Below BRE Guidelines		
	Total No. of Windows	No. of Windows That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Old Brewery Gardens	537	435	50	9	43
Travelodge	101	12	35	38	16
Total	638	447	85	47	59

Table 8.6 – Summary of NSL Daylight Results

Address	NSL				
			Below BRE Guidelines		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Old Brewery Gardens	426	408	13	4	1
Travelodge	101	80	11	7	3
Total	527	488	24	11	4

Old Brewery Gardens (118831/FO/2018)

- 8.73. A total of 537 windows serving 426 rooms were assessed for daylight within this building to compare the existing baseline against the Proposed Development.
- 8.74. For VSC, 435 (81%) of the 537 windows meet the BRE criteria. Fifty of the affected windows will experience an alteration between 20-30%, nine of the affected windows will experience an alteration between 30-40%, and the remaining 43 windows will experience an alteration in excess of 40% from the baseline value.
- 8.75. For NSL, 408 (96%) of the 426 rooms assessed will meet the BRE criteria. Thirteen of the affected windows will experience an alteration between 20-30%, four of the affected windows will experience an alteration between 30-40%, and the remaining one window will experience an alteration in excess of 40% from the baseline value.
- 8.76. This property is not yet constructed and occupied. As such, there are no residents in occupation to notice any reductions in light brought about by the Proposed Development. This means the sensitivity of this receptor is lower than if it were currently occupied. The Site was also previously

used as a surface car park, so it is cleared and therefore underdeveloped. As such, were Old Brewery Gardens constructed and occupied, it would be receiving unusually high levels of daylight and sunlight for a city centre location.

- 8.77. Fifty of the 111 windows which do not meet the BRE criteria for VSC daylight are reduced by between 20-30%, which is considered to be a minor impact given the city centre location. Furthermore, of the 111 windows that do not meet the VSC daylight criteria, 80 serve bedrooms, which are considered by the BRE as having a lesser requirement for daylight. This means that 31 windows serving living kitchen diners do not meet the target criteria, which represents less than 6% of windows assessed to this receptor, and is therefore a very small proportion in context to the building as a whole.
- 8.78. Notwithstanding the above, the property will retain average VSC daylight levels of 27.81% with the Proposed Development in place, against a target of 27%, which is excellent given the dense, urban nature of the Site and surroundings.
- 8.79. For NSL daylight, 11 of the 18 rooms which do not meet the BRE criteria are reduced by between 20-30%, which is a minor reduction, and all but two of these are bedrooms, which the BRE considers as having a lesser requirement for daylight. Two living kitchen diners therefore do not meet the NSL daylight criteria, which represents less than 1% of all rooms assessed to this receptor, and is therefore a very small proportion in context to the building as a whole.
- 8.80. The numerical results are one factor in determining the impact to a receptor. However, in context to this receptor, a relatively small proportion of windows to the building are impacted as only those facing the development site have been assessed. Whilst major adverse impacts are identified, a number of the affected windows/rooms are bedrooms which are considered as having a lesser requirement for daylight, meaning the overall impact is minor as the room is less sensitive, despite the numerical reduction. The sensitivity of the receptor is also important, as the same impacts to a building with a higher sensitivity may be considered more significant than this receptor, which is yet to be constructed. Overall, considering the minor nature of impacts, the context of a city centre location and the flexibility with which the BRE is intended to be used, the effect on daylight to this property is considered to be **minor adverse** in significance.
- 8.81. The effect on daylight is considered **non-significant** in EIA terms for the following reasons:
- The building is not yet constructed and occupied which means it has a lower sensitivity to changes in daylight;
 - Where impacts are identified, these are typically minor and limited in context to the receptor as a whole
 - The majority of windows/rooms that do not meet the BRE criteria are bedrooms, and a very small proportion of living kitchen diners are affected; and
 - The receptor will retain excellent average VSC daylight levels with the Proposed Development in place given the city centre location and context of the Site.

Travelodge

- 8.82. A total of 101 windows serving 101 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.83. For VSC, 12 (12%) of the 101 windows meet the BRE criteria. 35 of the affected windows will experience an alteration between 20-30%, 38 of the affected windows will experience an alteration between 30-40%, and the remaining 16 windows will experience an alteration in excess of 40% from the baseline value.

- 8.84. For NSL, 80 (79%) of the 101 rooms assessed will meet the BRE criteria. 11 of the affected rooms will experience an alteration between 20-30%, seven of the affected rooms will experience an alteration between 30-40%, and the remaining three rooms will experience an alteration in excess of 40% from the baseline value.
- 8.85. The nature and use of the property are a material consideration in understanding daylight impacts in context. Whilst the building provides residential accommodation, it is a commercial building, and its use as a hotel means that occupants are typically transient and will not reside in the building for a prolonged period of time. The BRE guide states that *"the guidelines...are intended for use for rooms in adjoining dwellings where daylight is required"*. It states further that the guidelines *"may also be applied to any existing non-domestic building where occupants have a reasonable expectation of daylight; this would normally include...hotels"*. As such, this building has a lower sensitivity to changes in daylight than if it were used as a permanent dwelling.
- 8.86. Given the building's use, all of the windows and rooms which do not meet the VSC and NSL daylight criteria are bedrooms. The BRE acknowledges that bedrooms in a residential dwelling have a lesser requirement for daylight, and this requirement is considered even less for hotel bedrooms.
- 8.87. Notwithstanding, 35 windows which do not meet the VSC daylight criteria, and 11 rooms which do not meet the NSL daylight criteria, are reduced by between 20-30%, which is a minor reduction given the city centre location. Only 16 windows and three rooms are reduced by in excess of 40% with the Proposed Development in place, which is a small proportion of those assessed and a very small proportion in context to the receptor as a whole given that only windows/rooms overlooking the Site have been considered in the assessment.
- 8.88. The building will continue to retain average VSC daylight levels of 16.88% with the Proposed Development in place, which is considered acceptable for the city centre location and commercial use.
- 8.89. Overall, considering the context of a city centre location, sensitivity of the receptor and the flexibility with which the BRE is intended to be used, the effect on daylight to this property is considered to be **minor adverse**.
- 8.90. The effect on daylight is considered **non-significant** in EIA terms for the following reasons:
- The building is used as a hotel and therefore provides short term residential accommodation for commercial purposes, meaning its sensitivity to change is low;
 - Reductions in excess of 40% are limited in context to the number windows and rooms assessed;
 - All of the rooms impacted are bedrooms;
 - Only windows/rooms overlooking the Site, which have potential to be impacted by the Proposed Development, have been assessed, meaning those which do not will be unaffected; and
 - The property will retain acceptable average VSC daylight levels for the city centre location when considering the use.

Sunlight to Surrounding Sensitive Receptors

- 8.91. The Full Proposed Development Sunlight results can be found within Appendix 8.2 and are summarised in Tables 8.8 and 8.9 below.
- 8.92. A total of 24 rooms were assessed for sunlight within one building considered to be a sensitive receptor.

8.93. Windows that are not within 90 degrees of due south, or do not serve living rooms, were excluded from the assessment. As such, the Travelodge has been excluded from the sunlight assessment.

8.94. The buildings are discussed in more detail below.

Table 8.8 – Summary of Annual Sunlight Results

Address	APSH				
			Below threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Old Brewery Gardens	24	22	0	0	0
Total	24	22	0	0	0

Table 8.9 – Summary of Winter Sunlight Results

Address	Winter PSH				
			Below threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Old Brewery Gardens	24	22	0	0	2
Total	24	22	0	0	2

Old Brewery Gardens (118831/FO/2018)

8.95. A total of 24 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.96. 22 (92%) of the 24 rooms meet the BRE criteria for both annual and winter PSH. The rooms will fully accord with the annual PSH criteria, whilst two rooms will experience an alteration in excess of 40% for winter PSH.

8.97. The building is not yet constructed and occupied and therefore has a lower sensitivity to change. All rooms assessed will meet or exceed the annual PSH target, and only two rooms do not meet the winter PSH target. This is a minor impact in context to the building as a whole and therefore considered acceptable given the lower sensitivity and city centre location. The two rooms will also receive 37% and 43% of the annual probable sunlight hours with the Proposed Development in place, which is substantially in excess of the 25% BRE annual target.

8.98. The effect on sunlight to this receptor is therefore considered to be **minor adverse** and **not significant** in EIA terms.

Mitigation Measures

Demolition and Construction

8.99. Owing to the evolving and changing nature of demolition and construction activities, the assessment of potential effects during demolition and construction of the Proposed Development on daylight and sunlight to surrounding properties has not been modelled.

8.100. Since the potential daylight and sunlight effects relating to demolition and construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed Proposed Development, the interim construction effects are not

assessed quantitatively as it is considered that the completed Proposed Development represents the worst case assessment in terms of likely daylight and sunlight.

Completed Development

- 8.101. Overall, the impact on daylight to the surrounding properties is considered minor adverse and the impact on sunlight is considered minor adverse. Overall, this is considered to result in **non-significant effects**. Given the urban context of the Site and nature of effects, no further mitigation is considered necessary.

Cumulative Effects

- 8.102. Where consented schemes have the potential to be affected by the Proposed Development, these have been included in the baseline scenario and assessed individually in detail, so no separate technical assessment of the cumulative impact is required. This approach is in line with the BRE Guidelines.

Residual Effects

Table 8.10 Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Daylight	Scoped Out	-	-	-
Sunlight	Scoped Out	-	-	-
Operational Phase				
Daylight	Surrounding Residential Properties	None Required	N/A	Minor Permanent Adverse (Non-Significant Effect)
Sunlight	Surrounding Residential Properties	None Required	N/A	Minor Permanent Adverse (Non-Significant Effect)

Reference List

- 8.103. This ES Chapter has been prepared by reference to the following:
- Revised National Planning Policy Framework (2019);
 - National Planning Practice Guidance (NPPG) 2019;
 - Manchester Core Strategy (2012 – 2027);
 - Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (Adopted April 2007);
 - Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition, 2011; and
 - British Standard (BS) 8206-2:2008: 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.

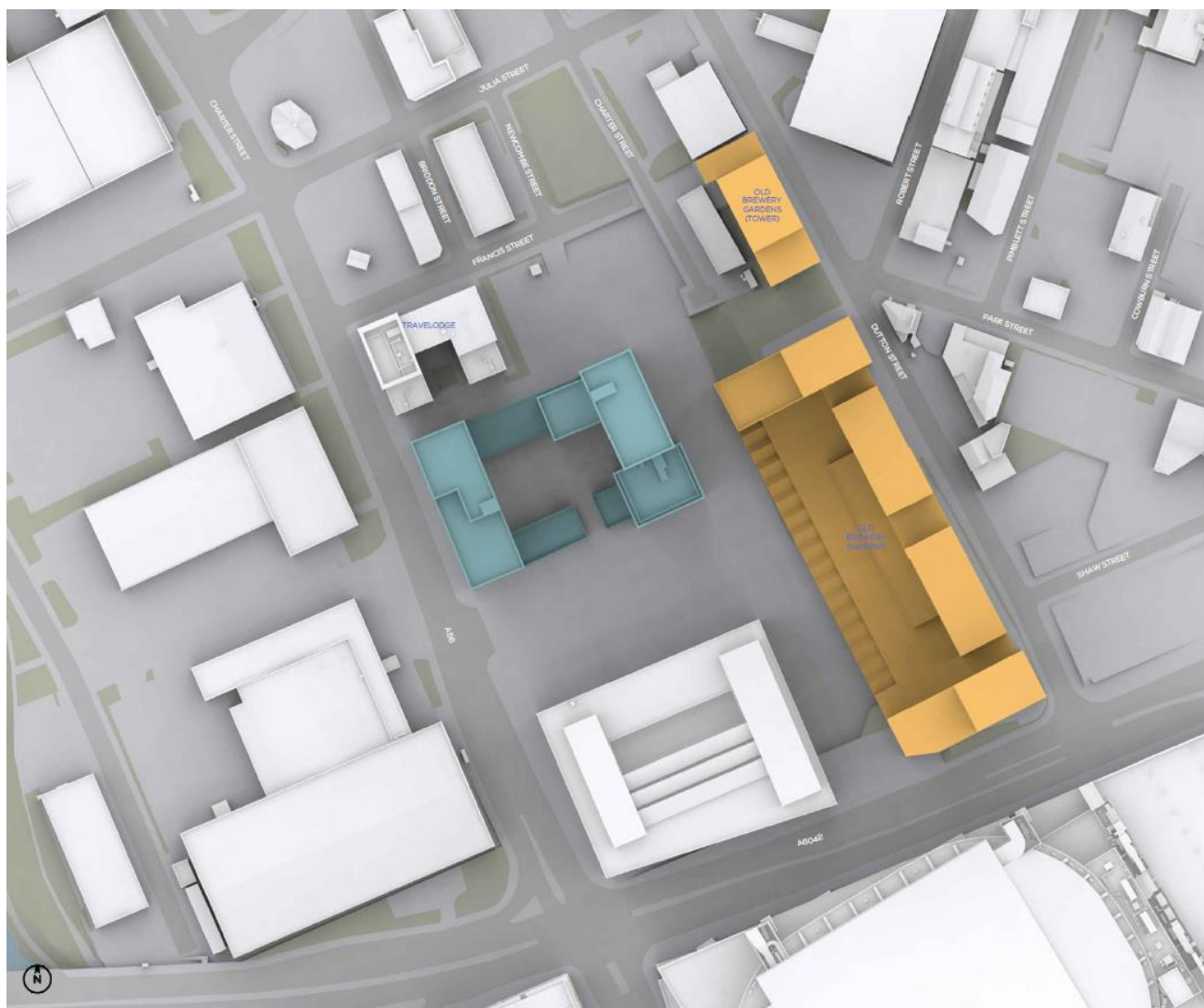


	Figure:	8.1		
	Title:	Map identifying the key environmental receptors considered in the assessment		
	Project:	Boddingtons		
	Date:	xxx 2021	Scale:	Scale /NTS

Human Health

Introduction

- 9.1. This Chapter assesses the likely significant effects of the Proposed Development on human health. This Chapter also describes the methods used to assess the identified impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant adverse impacts and the anticipated likely residual impacts after mitigation measures have been applied.
- 9.2. The Chapter has been prepared by Atkins, details of the authors and qualifications are listed below:
- David McLeod (Author)
 - B.Sc. Geography
 - M.Sc. Environmental Engineering
 - 7 years experience
 - Paddy McEntee (Co-author))
 - B.A. (Hons.) Geography
 - MSc in Applied Environmental Science
 - Member of Chartered Institution of Water and Environmental Management
 - Chartered Environmentalist (C.Env.)
 - Chartered Water and Environmental Manager (C.WEM)
 - 23 years of experience
 - Cristina West (Reviewer)
 - Environmental Engineer with specialism in sanitary engineering
 - M.Sc. Applied Environmental Economics
 - FCIWEM, C.Env.
 - Over 30 years experience

Legislative and Policy Context

- 9.3. It is essential that the proposed development conforms to the planning hierarchy and planning policy context where it is relevant to population and human health, at the local, regional and national levels. An overview of the plans, policies and strategies that are relevant to the proposed development in terms of population and human health is set out below.
- 9.4. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) includes a requirement to consider 'population and human health' amongst the other environmental topics for assessment. Other national and regional policy and guidance establish the link between planning and health, and the role and responsibility of the planning system and planning decisions to promote public health. The key policies are set out below.

Table 9.1 – Policy Overview

Scale	Policy Document	Key considerations for the proposed development
National	National Planning Policy Framework ¹	The NPPF outlines the important role that the planning policies and decisions should play in creating ‘healthy, inclusive and safe places’ by promoting social interaction, safety, accessibility and healthy lifestyles (see NPPF section 8). The influence of planning is not limited to the proactive promotion of health; the likely effects of pollution caused by new development on health and living conditions should be considered and mitigated (Paragraph 185).
	Planning Practice Guidance (2021) ²	Planning Practice Guidance (PPG) on Health and wellbeing states that, as the built and natural environments are major determinants of health and wellbeing, local planning authorities should consider these issues in planning decision making. Healthy communities are defined as those which support healthy behaviours, reduce health inequalities, and enhance physical and mental health. Where appropriate, healthy communities should also encourage active lifestyles – which can be facilitated through development (including transport and services) – and support social interaction through the creation of healthy living environments for people of all ages.
	Fair Society, Healthy Lives (the Marmot Review) 2010 ³	The Marmot Review found that individual health is influenced by wider ‘social’ determinants such as income, education, local environmental quality and employment. The review established six policy objectives for reducing health inequalities including ‘to create and develop healthy and sustainable places and communities’.
	Health and Social Care Act 2012 ⁴	This is a wide-ranging piece of legislation that places a duty of care to protect and improve public health on the Secretary of State for Health as well as other bodies directed by the Secretary of State for Health such as local authorities, including Directors of Public Health, and NHS (Sections 11, 12, 18, 22, 20, 31 and 60). The Act requires every local authority to use all the levers at its disposal to improve health and wellbeing, with the promotion and protection of health and wellbeing embedded throughout all directorates and functions, including spatial planning and development management.
	Public Health Outcomes Framework 2016-19 ⁵	The Public Health Outcomes Framework seeks to improve and protect the nation’s health and wellbeing and improve the health of the poorest fastest, measured through healthy life expectancy and its discrepancy with life expectancy. The Framework summarises the public health responsibilities of boroughs and establishes indicators to measure progress towards the objectives of improving the wider determinants of health and of helping people to live healthy lifestyles. These include several which may be affected by planning decisions, as follows: • Killed and seriously injured casualties on England’s roads; • The percentage of the population affected by noise; • Utilisation of outdoor space for exercise/health reasons; • Social isolation; • Excess weight in adults and children; • Proportion of physically active and inactive adults; and • Self-reported well-being.
	Public Health England (PHE)	This Strategy outlines the Public Health England foremost priorities to help protect people and enable them to live longer in good health. Among the priorities are for cleaner air, better mental health and the best start in life for

Scale	Policy Document	Key considerations for the proposed development
	Strategy 2020-2025 (2019)	children. Recognition is made in the Strategy of disproportionate impacts on certain sections of society that result in health inequalities and the need to tackle these – this includes recognition of the role that deprivation plays in poor health outcomes, as well as the importance of staying active. Recognition is also made of the importance of having ‘a decent place to live’.
	Public Health England Spatial Planning for Health (2017)	This document recognises that many of our most pressing health challenges, from obesity and physical activity to mental health and air quality, can all be influenced by the quality of our built and natural environment. In 2017, PHE published ‘Spatial Planning for Health: An evidence resource for planning and designing healthier places’, which assessed the impact of neighbourhood design, housing, transport, the natural environment and the food environment on health. This provides local planners, policy-makers and health professionals with a summary of the available evidence to guide good practice, showing how the design of sustainable environments can help provide the conditions for good health and reduce health inequalities by improving access to leisure and green spaces, public services and community facilities. The findings add to the case for upstream action to address key obstacles to healthy living and have supported PHE’s work with the Ministry for Housing, Communities and Local Government and the NHS Healthy New Towns programme to put health at the heart of key national planning activities.
Regional	Greater Manchester Combined Authority Health Strategic Five Year Plan	In February 2015 the 37 NHS organisations and local authorities in Greater Manchester signed a landmark devolution agreement with the Government to take charge of health and social care spending and decisions in the city region. This Plan recognises that Manchester generally has worse health outcomes than England, though it is noted that impact of housing, employment, air quality, early years services, education and skills on health and wellbeing is well understood and the Plan sets out how these issues can be addressed.
	Greater Manchester ‘Places for Everyone’ (Draft August 2021)	Places for Everyone is a 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. It has been published by the GMCA on behalf of the nine districts. A key element to this Plan is to make Manchester a place where people live healthy lives and older people are valued and this is reflected in the Plan Objective to promote health and wellbeing of communities. It is to be noted that this draft Plan supersedes that outlined previously as the ‘Greater Manchester Spatial Framework’.
	Greater Manchester Combined Authority Health Strategic Five Year Plan	The council is responsible for promoting and protecting the health and wellbeing of people in the city. They have a range of public health functions, but there are five specific responsibilities described by law: • Helping protect people from the dangers of communicable diseases and environmental threats. • Organising and paying for sexual health services. • Providing specialist public health advice to primary care services: for example GPs and community health professionals. • Organising and paying for height and weight checks for primary school children. • Organising and paying for regular health checks for Manchester people. Five priority areas of the Health Plan:

Scale	Policy Document	Key considerations for the proposed development
		- Improving outcomes in the first 1,000 days of a child's life - Strengthening the positive impact of work on health - Supporting people, households, and communities to be socially connected and make changes that matter to them - Creating an age-friendly city that promotes good health and wellbeing for people in mid and later life - Taking action on preventable early deaths Recognition is made in this Plan that better housing can help to prevent physical illness and reduce stress, and good heating and insulation helps to keep people well in winter.
Local	Manchester City Council Health Plan 2018-2027	Manchester's Local Development Framework (Core Strategy) sets out a range of policies to implement the vision for Manchester in 2027 set by the City Council. This Strategy recognises that there are health challenges in Manchester, including health inequalities – part of the vision for Manchester by 2027 is to have a healthy population. To help address such issues, the Core Strategy sets out the need to provide for a significant increase in high quality housing provision at sustainable locations throughout the City, to both address demographic needs and to support economic growth. The emphasis will be on providing a good range of high quality housing, (in terms of size, type, tenure, accessibility and price) including affordable housing across the City; to create sustainable lifetime neighbourhoods with high quality environments, good local facilities and with easy access to employment opportunities. The Core Strategy also sets out the need to promote health lifestyles and contribute to a sense of wellbeing.
	Manchester City Council Core Strategy 2012 (Note the Manchester City Council Local Plan is currently under review)	In February 2015 the 37 NHS organisations and local authorities in Greater Manchester signed a landmark devolution agreement with the Government to take charge of health and social care spending and decisions in the city region. This Plan recognises that Manchester generally has worse health outcomes than England, though it is noted that impact of housing, employment, air quality, early years services, education and skills on health and wellbeing is well understood and the Plan sets out how these issues can be addressed. It is to be noted that this Core Strategy contains a series of Policies relevant to health 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 CC1 Primary Economic Development Focus: City Centre and Fringe states that the focus of employment growth is in the City Centre and will be a suitable location for consideration of high density buildings. Policy CC3 Housing advises that the most intensive development of housing will be in the City Centre. Policy CC6 High Density Development is a location where land should be used to maximise its efficiency. Policy CC7 Mixed Use Development guides that the City Centre presents the most viable opportunities for mixed use development. Policy CC10 A Place for Everyone advises that the City Centre will develop as a location which appeals to a wide range of residents and visitors. 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.

Scale	Policy Document	Key considerations for the proposed development
		Policy H1 Overall Housing Provision defines high-density developments as those with over 75 units and states that they are appropriate in the City Centre. Policy EN4 seeks to reduce CO2 emissions 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 & 11 safeguard and create new open space, sport & 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.

Assessment Methodology and Significance Criteria

- 9.5. Despite the requirement to consider ‘population and human health’ amongst the other environmental topics for assessment, the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 do not establish the way in which this topic is to be addressed and there is no prescribed EIA definition for ‘population and human health’. This assessment notes the Institute of Environmental Management and Assessment guidance contained in ‘Health in Environmental Impact Assessment: A Primer for a Proportionate Approach’ and the World Health Organisation (WHO) definition of health used by the public health profession in the UK: health is defined as ‘a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.’
- 9.6. It is to be recognised that many of the effects on population and human health are considered within the specific relevant chapters to this EIA. The specific assessments are included within the following chapters:
- Air Quality (Chapter 6)
 - Climate Change (Chapter 7)
 - Daylight, Sunlight and Overshadowing (Chapter 8)

- Wind (Chapter 11)

- 9.7. This chapter therefore considers all relevant information included within the above sections that relate to human health and as such relevant chapters should be consulted for further information. This chapter also identifies those health receptors in the area i.e. local residents and those working, visiting or using facilities in the study area.
- 9.8. From a public health perspective, likely changes in, for example, air quality or noise levels are changes in determinants of health, not changes in health outcomes. Therefore, the consideration of potential significant effects on population and human health also requires a separate consideration of the way in which any change identified in the various technical chapters of the EIA, can be expected to manifest itself in health and well-being outcomes.
- 9.9. Impacts on population and human health can be influenced (both negatively and positively) by a number of wider health determinants and are further influenced by local community circumstance and existing health profiles. Therefore, the human health assessment will also consider the distribution of any potential impacts of the Proposed Development within the affected population, including potential impacts on more vulnerable, sensitive, or disadvantaged population groups. The location and presence of these groups within the study area and their profiles are described in greater detail in Table 9.5.
- 9.10. The assessment methodology uses the following assessment steps:
- 9.11. Study area - the study area(s) relevant to population and human health are identified and summarised;
 - Sensitive receptors - the physical and human receptors that have potential to be impacted or affected by the Proposed Development (both positively or negatively) are identified, including the presence of sensitive/vulnerable groups that would be more susceptible to impacts or effects arising from the Proposed Development;
 - Wider determinants of health - the wider health determinants (i.e. a diverse range of social, economic and environmental factors which influence people's mental and physical health) considered relevant to the Proposed Development are identified and described;
 - Sensitivity of receptors - the sensitivity of the physical and human receptors to changes to the wider health determinants is described; and
 - Assessment criteria - the criteria for assessing the magnitude of impact and significance of effects (both positive and negative) of changes to the wider health determinants for the physical and human receptors is described.

Establishing the baseline

- 9.12. The likely significant effects of the Proposed Development on population and human health have been predominantly assessed for the development site and its immediate environs, alongside a study area which comprises a 500 metre buffer from the Proposed Development/ construction boundary, however other study areas have been used when developing the baseline profile and assessing the potential significant impacts likely to arise from the Proposed Development. The following study areas have been used:
 - A study area consisting of 500 metre buffer extending outwards from the Proposed Development boundary/ construction footprint, to identify receptors and potential significant impacts that may arise as a result of the Proposed Development. This study area has been chosen as from a population and human health perspective it is likely to capture the key sensitive physical and human health receptors which have the potential to be

affected by the Proposed Development. Within this study area, the level of impact on population and human health will generally, but not exclusively, be considered on the basis that the closer the proposed works occur to sensitive receptors (e.g. industrial premises would be the physical receptor; the people that work at or use these premises would be the human receptors), the more mitigation may be required (e.g. close to the proposed works or more directly affected, as opposed to 500m away) - bearing in mind that each receptor and individual has different susceptibilities and some individuals or groups may be particularly vulnerable or susceptible to certain changes to the baseline conditions.

- A wider study area used to define the characteristics and sensitivity of local communities and the context within which the local economy operates. This wider study area is generally defined to include:
- The Manchester City local authority area (with a particular focus on the Cheetham ward);
- The regional area where appropriate;
- Another wider study area used to define the characteristics of population and human health, and health inequalities. This includes the area within which the local and regional National Health Service (NHS) organisations operate.
- And finally, each of the study areas defined in the assessment methodology sections for each of the other relevant technical chapters have also been applied.

- 9.13. It is considered that these various study areas and the different lenses used to look into each of the areas will capture the most relevant population and human health significant effects likely to arise from the Proposed Development, including likely significant effects on physical and mental health, and social wellbeing. As such, the assessment will provide an opportunity to identify ways in which health risks can be minimised and opportunities to improve health can be maximised.

Assessment criteria

Identifying the sensitive receptors

- 9.14. Using professional judgement and best practice guidance, the assessment is based upon IEMA guidance contained in 'Health in Environmental Impact Assessment: A Primer for a Proportionate Approach' and the WHO definition of health used by the public health profession in the UK. Here, health is defined as a 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'.
- 9.15. In general terms, the assessment considers the potential significant effects of the Proposed Development on two types of population. The first is the general or wider population / groups (e.g. workers and contractors constructing and operating the Proposed Development, workers at nearby local businesses, residents living in houses, operators and users of community land and facilities, owners and users of commercial premises, users of footpaths and cycle routes, users of open space, recreation and leisure facilities, vehicle travellers, public transport users). The second type of population considered is vulnerable groups identified within the general population who may be more susceptible to changes to the baseline conditions as a result of the Proposed Development.
- 9.16. The baseline study has been used to identify the key physical and human receptors in the main study areas which have potential to be affected by the Proposed Development, including the presence of any human vulnerable or sensitive groups. As such, the assessment considers the potential effects of the Proposed Development on two types of receptors: physical receptors (e.g. residential properties, schools, community facilities, local businesses, commercial interests, recreation routes or spaces, roads, footpaths etc.) and then the human receptors that are present or use these physical receptors.

Wider Health Determinants

- 9.17. The quality of the built and natural environment such as housing quality and air quality effect health. In considering how the Proposed Development activities are likely to affect the health of the local population, wider health determinants are used. Wider health determinants are a diverse range of social, economic, and environmental factors which influence people's mental and physical health, and social wellbeing.
- 9.18. By using and adapting the 'Determinants of Health' model (see Figure 9.1), the following wider health determinants have been included for assessment:
- Global ecosystem – climate stability
 - Natural environment – air pollution; soil and water pollution; increase in the presence of pests
 - Built environment – risk of injuries and death; noise pollution and vibration; housing; open space and
 - greenspace
 - Activities – transport options and active travel; healthcare services and other social infrastructure
 - Local economy – work and training and access to businesses;
 - Community & lifestyle – Community sustainability, viability, cohesion, and integration

Sensitivity of the physical receptors / resources and human health receptors to changes to the wider health determinants

- 9.19. The potential impacts and effects (both positive and negative) of the Proposed Development on the health, and social wellbeing of the local population depends on the sensitivity of the physical and human receptors to changes to the wider health determinants. The sensitivity of the physical and human receptors depends on whether the receptor is likely to be directly or indirectly impacted or affected by changes to the wider health determinants caused by the Proposed Development and whether the receptors are well placed to deal with any of these changes. This is set out in further detail in Table 9.2.

Table 9.2 – Criteria for determining the value or sensitivity of the physical and human receptors to changes to the wider health determinants

Receptor value / sensitivity	Physical receptor – high level definition of receptor value / sensitivity	Human receptor – high level definition of receptor value / sensitivity
Very high	Physical receptor is of very high importance and rarity, international scale and very limited (i.e. no potential for substitution/replacement). Very high vulnerability to change, very well placed to take advantage of beneficial impacts, and/or very poorly placed to deal with any adverse impacts	Health receptor susceptible to direct permanent, sustained, or irreversible exposure or impacts. Receptor is very well placed to take advantage of beneficial impacts, and/or is very poorly placed to deal with any adverse impacts.
High	Physical receptor is of high importance and rarity, national scale, and limited potential substitution/replacement. High vulnerability to change, little ability to absorb change for the following (or similar) reasons: Resource is frequently used	Health receptor susceptible to permanent or reversible exposures resulting in longer-term impacts. Receptor is well placed to take advantage of beneficial impacts, and/or is not well placed to deal with any adverse impacts.

Receptor value / sensitivity	Physical receptor – high level definition of receptor value / sensitivity	Human receptor – high level definition of receptor value / sensitivity
	No reasonable alternative facilities, access routes or opportunities available	
Medium	Physical receptor is of medium or high importance and rarity, regional scale, and limited potential for substitution/ replacement. Medium vulnerability to change, limited ability to absorb change for the following (or similar) reasons: Resource is semi-frequently used Limited range of reasonable alternative facilities, access routes, or opportunities available	Health receptor susceptible to frequent to infrequent or reversible, short to medium term exposures or impacts. Average ability to maximise beneficial impacts or cope with adverse impacts.
Low	Physical receptor is of low or medium importance and rarity, local scale, and considerable potential for substitution/ replacement. Low vulnerability to change, can easily absorb changes due to the following (or similar) reasons: Resource is infrequently used Reasonable alternative facilities, access routes or opportunities available	Health receptor susceptible to infrequent or reversible short-term exposures or impacts. Receptor is not well placed to take advantage of beneficial impacts, and/or is well placed to deal with any adverse impacts.
Negligible	Physical receptor is very low in importance and rarity, local scale, and ample potential for substitution/replacement	An impact that is likely to be temporary in nature, or which is anticipated to have a discernible impact on health receptors

Magnitude of Impact

- 9.20. Identifying and assessing the likely impacts of the Proposed Development (both positive and negative) depends on the sensitivity of the physical and human receptors to changes to the wider health determinants (for example, from changes to air quality, noise pollution and vibration etc.).
- 9.21. Where appropriate, the assessment will also use the findings as outlined in the other technical chapters of the EIA and consider how these findings can be expected to impact health and well-being outcomes, including the distribution of any impacts within the local population (e.g. on sensitive/vulnerable groups who would potentially be more susceptible to certain impacts arising from the Proposed Development).
- 9.22. However, the wider health determinants of housing, access to services and healthcare, risk of injuries and death, community sustainability, viability, cohesion, and integration, open space and greenspace, work and training are not covered by the other technical assessments. Therefore, professional judgement, industry best practice and experience from the assessment of similar and other development types will be used to assess the impacts and affects to these wider health determinants.
- 9.23. The magnitude of impact for any changes to the wider health determinants on physical and human receptors will be assessed according to the criteria set out in Table 9.3. The magnitude of impact is primarily derived from the following impact parameters:
- Geographical scale of impact;
 - Secondary or cumulative;
 - Short, medium or long-term;

- Permanent or temporary;
- Reversible or irreversible; and
- Beneficial or adverse.

Table 9.3 – Magnitude of impact criteria for the physical and human receptors

Magnitude of Impact	High level description of the magnitude of impact for the physical receptors	High level description of the magnitude of impact for the human receptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.	Permanent, sustained or irreversible impact to the wider health determinant; impact represents a substantial change (positive or negative) from the baseline position; affecting a large number of people/ most people in the community; affecting sensitive population groups; a large widening or narrowing of inequalities; a direct and large contribution (positive or negative) to a recognised health priority.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.	Permanent or reversible exposure resulting in longer-term impact to the wider health determinant; impact represents a notable change (positive or negative) from the baseline position; affecting a moderate to large number of people; affecting some sensitive population groups; a widening or narrowing of inequalities; a direct and large contribution (positive or negative) to a recognised health priority.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to one (maybe more) key characteristics, features or elements.	Infrequent or reversible short-term impact to the wider health determinant; impact represents a slight change (positive or negative) from the baseline position; affecting a low to moderate number of people; affecting few sensitive population groups; a slight widening or narrowing of inequalities; an indirect or minor contribution (positive or negative) to a recognised health priority.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.	No discernible change in health or wellbeing within normal variations; no discernible change in exposure levels or reversible changes; no discernible change (positive or negative) from the baseline position; no discernible widening or narrowing of inequalities; no links to a recognised health priority.
No Change	No loss or detrimental alteration to one or more characteristics, features or elements; no observable effects in either direction.	No impact to the wider health determinant or to sensitive groups.

Significance of Effect

- 9.24. The significance of effect is the product of the sensitivity of the physical and human receptors and magnitude of impact. The significance of effect within the assessment will be measured according to the Significance of Effect Matrix, set out in Table 9.4. The significance of effect will be determined by using professional judgement, best practice, and knowledge from the assessment of other development types.
- 9.25. Significance of effects can be neutral, beneficial, or adverse and will be further informed by considering the permanence of effect (temporary or permanent), type of effect (direct or indirect) and duration of effect (short-term or long-term). In general, temporary effects are for a limited period of time i.e. not permanent (this limited period can vary depending on the activity); short-term effects to the physical and human receptors are predicted to last for several months up to a

few years and would generally apply for the duration of the construction period. Long-term effects are predicted to last beyond this, for several years.

- 9.26. Where Table 9.4 identifies two potential outcomes e.g. Moderate (significant) or Large (significant), or Slight (not significant) or Moderate (significant), professional judgement will be applied in each instance to determine the appropriate level of significance.

Table 9.4 – Significance of effect matrix

Receptor Sensitivity	Impact magnitude					
		No change	Negligible	Minor	Moderate	Major
	Very high	Neutral	Slight	Moderate or Large	Very Large or Large	Very Large
	High	Neutral	Slight	Moderate or Slight	Moderate or Large	Very Large or Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Large or Moderate
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Moderate or Slight
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

- 9.27. For the purposes of the assessment, Very Large, Large or Moderate effects are deemed to be significant and those Slight or Neutral, to be not significant.

Cumulative effects

- 9.28. This chapter considers the potential cumulative effects of the Proposed Development on population and human health. Human health assessment is by nature an in-combination assessment of the potential impacts or effects on population and human health (both positive and negative) arising from the environmental effects of the Proposed Development – see Section 7 for consideration of cumulative effects.

Limitations and Assumptions

- 9.29. This assessment of likely effects of the proposed development on human health is based on guidance and professional judgement and considers both the negative and positive contribution that the Proposed Development could have on receptors, including the presence of sensitive groups. It provides a high-level assessment of likely effects on human health based on a proportionate assessment.
- 9.30. Whilst it is possible to identify past trends in the incidence and prevalence of health conditions, there is no accepted method for predicting health into the future for all health effects considered in the assessment. Where information is available to inform the assessment of health effects, this has been referenced and incorporated into the assessment. Where information is not available, it is assumed that the population affected in the future assessment years will have the same health status as the population in the baseline. This limitation does not affect the robustness of the assessment.
- 9.31. Whilst it will be possible to identify changes to some of the wider health determinants relevant to the Proposed Development, health outcomes are dependent on multiple factors, some of which rest with individuals and/or fall outside the powers or influence of physical infrastructure and/or planning decisions. Identifying health effects of the Proposed Development and their significance is therefore a qualitative exercise.
- 9.32. The findings are based upon a high-level desk-based study of the area and information provided by the Development Team, along with consultants' professional judgement and knowledge based

on similar and other types of development. Information, where relevant, has been used from other technical assessments (such as air quality, noise, transport, water, climate change) to help to assess the potential health impacts of the Proposed Development on receptors. No consultation, site visits or specialist information requests have been required to inform the assessment and no specialist mapping or address based services were utilised to identify exact receptors.

- 9.33. The health assessment is by nature a cumulative assessment which considers the population and human health impacts of all environmental effects of the Scheme. This Chapter considers the findings relevant to human health of each technical impact assessment scoped into the Environmental Statement and as such, any key assumptions or limitations associated with each technical impact assessment are addressed within the individual chapters. Therefore, there is a degree of overlap between this chapter and the other technical chapters of the ES.

Baseline Conditions

Local Health Profile

- 9.34. The Development Site is located in the Manchester City Council local authority area. The key population and human health baseline findings of interest to the assessment show that the population of the Local Authority area is 541,000⁶, of which 22.2% were aged under 18, while 9.3% were over 65. There is also a significant percentage (28.5%) of the local population from an ethnic minority group.
- 9.35. The health of people in Manchester City is generally worse than the England average. Manchester is one of the 20% most deprived districts/unitary authorities in England and approximately 28% (29,600) of children live in low income families. Life expectancy for both men and women is lower than the England average – 8.1 years lower for men and 7.0 years lower for women in the most deprived parts of the Local Authority area.
- 9.36. The life expectancy gap between Manchester City and England can be largely attributed to three broad causes of death: circulatory diseases, cancers and respiratory diseases. These conditions in turn are closely associated with poor lifestyle. All of the modifiable lifestyle factors that lead to poor health outcomes are highly prevalent in Manchester: high numbers of overweight or obese children, high recorded levels of drug misuse; high levels of alcohol use and poor diets⁷.
- 9.37. Across a range of health indicators such as those relating to behavioural risk factors (alcohol, smoking levels etc.) as well as child health, the Local Authority area performs significantly worse than the average for England as a whole. This is also the case for wider determinants of health such as the number of children in low income families, educational attainment, violent crime levels, as well as other indices of health protection such as new sexually transmitted disease.
- 9.38. However, the Local Authority area performs in line (not significantly different) with the England average in terms of injuries and ill health. This includes indicators such as hospital stays for self-harm, cancer diagnosed at an early stage, diabetes diagnoses and dementia diagnosis.
- 9.39. One aspect where the Local Authority area performs significantly better than the England average is in relation to the number of people killed and seriously injured on roads.
- 9.40. The proposed development falls within the Cheetham ward of Manchester City. This ward has a total population of 20,558 (2019 mid-years estimate)⁸, of which 1,281 are aged over 65 and 5,050 are aged under 16. Life expectancy is significantly worse for both males and females in Cheetham than for England as a whole.
- 9.41. The Cheetham ward has significant numbers of Black and Minority Ethnic population (65.3%), with a population whose ethnicity is not 'White UK' of 74.2%. This is significantly greater than for Manchester City (40.7%) as a whole.

- 9.42. Cheetham is significantly more deprived in terms of income (26.3%), child poverty (30%) and older people (57.7%) compared to England as a whole. Overcrowding of houses is also a significant issue in Cheetham, though there is no significant difference with England as a whole in terms of older people living alone – perhaps a reflection of the ethnic make up of the ward, with multiple generations of families living together.
- 9.43. Cheetham also performs significantly worse in terms of unemployment (including long term unemployment).
- 9.44. Cheetham performs significantly worse than England as a whole in terms of emergency hospital admissions (for a range of causes including accidents and heart disease), although it performs better in areas such as self-harm. It also performs worse in terms of death from all causes, death from circulatory disease, coronary disease, stroke and respiratory disease. However, there is no significant difference between Cheetham and the rest of England in terms of cancer (other than lung cancer which is significantly worse). Cheetham also performs significantly better than England as a whole in terms of limiting long term illness and in behavioural risk factors such as smoking.

Local Health Receptors & Vulnerable Groups

- 9.45. There is a variety of physical and human receptors in the study area (within 500m of the proposed development site) as would be expected from an inner city area, however there are very few areas of residential housing, with the nearest being located within approximately 475m at Sandywell Lane and separated from the site by built development, a number of roads and the River Irwell. In addition to the range of commercial premises found in the locality such as general warehousing and similar, light industrial units, various takeaway businesses, derelict sites and a number of public car parks, a selection of typical identified receptors in the wider area include (but are not limited to):
- HMP Manchester (approximately 200m to the north)
 - The River Irwell (approximately 200m to the west)
 - Faith Life centre (approximately 300m to the west)
 - Manchester Cathedral (approximately 530m south)
 - Manchester Victoria Rail Station (approximately 380m south)
 - Cheetham's Library and National Football Museum (approximately 450m south)
 - The Friars Primary School (approximately 800m west)
 - AO Arena (approximately 150m south)
 - Indoor climbing centre / children's play area (approximately 150m west)
 - Travelodge Manchester is immediately adjacent to the north of the site
- 9.46. See a range of further identified receptors on Figure 9.1.
- 9.47. Given the location of the site on the edge of the busy Manchester city centre, there are a large number of roads and footpaths in proximity of the development site, as well as further afield, which provide good connectivity to the wider area.
- 9.48. No schools or other educational establishments have been identified in the immediate study area, however a new college is being constructed adjacent to the site. Similarly, no health facilities such as hospitals have been identified, though there are some local health services such as pharmacies and a clinic (private dental and medical care) within 500m of the proposed development.

- 9.49. In addition to wider groups of population (including residents and workers living/working in the proximity of the Proposed Development who are likely to be exposed to changes to health determinants), IEMA guidance for assessing health impacts also recommends that specific attention should be paid to impacts on vulnerable groups in the proximity of the Proposed Development. These groups are likely to be more susceptible to the changes to health determinants than other social groups and are defined by their age, health status and income. Table 9.1 Below presents a review of the baseline conditions with respect to the various population groups included within this assessment.

Table 9.5 – Human receptors and Vulnerable Groups

Group	Relevant receptor / medium	Explanation	Are these sensitive groups identified in the study area?
Wider Groups – adults / working people	Residents living in houses, operators and users of community land and facilities, users of open space, recreation and leisure activities, Non-motorised Users (NMU), public transport users and vehicle travellers	The key challenge to the physical health, mental and social wellbeing of the local resident population arises from inactivity and unhealthy lifestyle choices and are also linked to the local transportation and road network. Residents of properties in the wider study area, employees and customers at the retail, commercial and industrial businesses interspersed throughout the area, walkers and cyclists using recreation routes and the local footpath and cycleway network, visitors to nearby visitor attractions, and public transport users are likely to be most exposed to health impacts.	Yes – the proposed development site is located within Cheetham ward, immediately adjacent to Manchester city centre. This ward has a total population of 20,558 (2019 mid-years estimate) ⁹ , of which 1,281 are aged over 65 and 5,050 are aged under 16. There are a number of business premises within the surrounding area to the development, although residential properties are further afield and separated from the site by the River Irwell.
Vulnerable Group - Families with children and adolescents, (pregnant women, babies, children and adolescents)	Residential houses, community services and facilities, open space, greenspace and recreational facilities, PRow, local footpaths and cycleways, Schools nurseries, day care centres, residential houses	Children and adolescents constitute a sensitive population group due partly to their need to be able to move around freely to and from school, open space, greenspace and recreational activities, whilst they lack the experience and judgement displayed by adults when moving around in traffic and public spaces¹⁰ and when using public transport and related infrastructure. Hence, children and adolescents as pedestrians¹¹ and cyclists are at elevated risk from danger distributed by motorised transport. Furthermore, children are more sensitive than adults to air pollution¹², noise¹³, odour¹⁴ and other environmental factors and their bodies and minds are less able to deal with them. Particularly susceptible children are those from low-income¹⁵ and/or black and	Yes – while there are no residential properties or schools etc. in the immediate vicinity of the development site, it is reasonable to anticipate that this vulnerable group utilises the services and attractions within the surrounding area.

Group	Relevant receptor / medium	Explanation	Are these sensitive groups identified in the study area?
		minority ethnic (BME) backgrounds ¹⁶ and/or living in deprived areas.	
Vulnerable Group – People who are physically or mentally disadvantaged (elderly people, people with physical disabilities, people with other health problems or impairments)	Residential houses, retirement / Care homes, community services and facilities (including health centres / clinics and hospitals), open space, PRoW and local footpaths	Elderly people constitute a sensitive group as they are more sensitive than young and middle-aged adults. Generally, the older people are, the slower their movement and reactions and the poorer their hearing¹⁷. They can be more at risk from injury and may fear falls, steps or lack of suitable footpaths, lack of safe crossing points and short crossing times at safe crossing points and other aspects of the surrounding built environment¹⁸. This can deter them from outdoor activity, especially walking, whereas walking is critical for muscle strength and reduces the risk of falls amongst other benefits. Elderly people can also feel more sensitive when using public transport^{19, 20}. They also often need to seek health services. Their continuing independence at home is often dependent on having available a range of transport mode and route options. People who are disabled and/or with physical and/or mental illnesses or impairments constitute a sensitive group as they may not be able to access many forms of transport or need special arrangements and/or support to access these²¹. They are more likely to find it difficult to walk or travel independently and can also be disadvantaged by the cost of transport. Any changes in access, such as greater travel distances, diversions or replacement services during construction would have particular impacts on this group. Chronically ill persons, for example, people with impaired lung function, can be more adversely affected by air pollution²². The same is true of hypersensitive individuals such as asthmatics²³. Noise can cause hypertension and cardiovascular problems²⁴. Those who already have these conditions can be more troubled by noise than others. People with existing physical and mental illnesses, including sleep disturbance, anxiety and depression, are likely to be more sensitive to changes to their local environment.	Yes – while there are no residential properties or retirement / care homes or hospitals etc. identified in the immediate vicinity of the development site, it is reasonable to anticipate that this vulnerable group utilises the services and attractions within the surrounding area. This could include those using Pharmacies and private dental / medical facilities in the area.
Vulnerable Group - People who are	Residential houses, community services and facilities, local	People on low incomes (living in deprived areas is a proxy measure for low income) and people without access to a car	Yes – the proposed development falls within the Cheetham ward

Group	Relevant receptor / medium	Explanation	Are these sensitive groups identified in the study area?
materially disadvantaged	businesses, open space, greenspace and recreational facilities, PRow, local footpaths and cycleways, public transport, bus stops	constitute a sensitive group as they are likely to walk further because they cannot afford public transport or to own a car, and their lack of transport options may limit life and work opportunities. Those on low incomes may be less able to adapt to changes in access, such as greater travel distance or alternative transport provision. People living in deprived areas tend to suffer the most from road traffic incidents (deaths and injuries), noise and air pollution, as they tend to be characterised by high traffic volume, as well as other environmental burdens such as industrial facilities. This group is generally more likely to already have reduced access to health and social care as well as reduced access to other services and amenities. This group may have increased stress levels due to the factors above. In addition, this group is more sensitive to food insecurity, which has an access dimension.	which is considered to be significantly more deprived in terms of income (26.3%), child poverty (30%) and older people (57.7%) compared to England as a whole.
Vulnerable Group – those of certain ethnicities	Residential houses, community services and facilities, local businesses, open space, greenspace and recreational facilities, PRow, local footpaths and cycleways, public transport, bus stops	People from ethnic minority groups are more likely to live in areas of deprivation and suffer the effects on health and wellbeing associated with such areas, including for example, the effects of poor air quality etc., than the wider population as a whole. It is also known that people from ethnic minority groups are also more likely to suffer poor diet and have poorer health outcomes than the population as a whole.	Yes – the proposed development falls within the Cheetham ward which has significant numbers of Black and Minority Ethnic population (65.3%), with a population whose ethnicity is not 'White UK' of 74.2%. This is significantly greater than for Manchester (40.7%) as a whole.

- 9.50. Following IEMA guidance on the UK public health profession's 'wider determinants of health' model, this assessment considers human health to be underpinned by wider determinants spanning environmental, social and economic aspects as follows: the global ecosystem; natural and built environment; activities; local economy; community; lifestyle; and individual factors. Of those listed, wider determinants which are potentially influenced by development and therefore scoped in for assessment are the global ecosystem, natural and built environment, activities, local economy, community, and lifestyle.

Identification and Evaluation of Significant Effects

- 9.51. This Section of the report addresses the likely significant effects of the Proposed Development on human health of the local population. The proposed development is anticipated to generate changes to wider health determinants during construction. Where impacts to wider health determinants are identified, the tables presented in Chapter 12 provide detail on what the mechanism for the impact is, alongside an assessment of impact severity (pre-mitigation) on each direct health determinant.

- 9.52. During construction and operation, it is anticipated that human health could potentially be affected in respect of the following determinants.

Table 9.6 – Health determinants considered in assessment

Determinant		Scoped In or Out?	Rationale
Natural Environment	Air Quality	In	Further assessment is required of potential effects of the proposed development on air quality from dust emissions and emissions from construction traffic, and dust from construction activities. These effects are assessed as part of the air quality assessment.
	Soil & Water Pollution and amenity	In	Further assessment is required of the potential effects from disturbance of contaminated land and exposure of contaminants. Consideration of amenity impacts, such as those relating to odour, lighting and changes to views.
	Increase in the presence of pests	In	Construction activities could give rise to disturbance and an increase in the population of pests or migration of pests off-site
Built Environment	Risk of Injury and death	In	Due to the location and scale of the proposed development and construction activities, further assessment is made of the potential effects on risk of injury and death from construction activities and construction vehicles and increased traffic on the local road network.
	Noise pollution and vibration	In	Further assessment is required of the potential effects of noise and vibration from construction activities and construction traffic associated with the proposed development. These effects are assessed as part of the noise and vibration assessment.
	Housing	Out	There are no current residents on the site and the nearest residential properties are over 250m away.
	Open Space and Greenspace	Out	The current use of the site is a car park and there are few areas of open space and greenspace in proximity to the site. Therefore, there would be no significant construction impacts.
Activities	Transport options	In	The proposed development will result in the introduction of construction traffic and traffic management measures which have the potential to cause disruptions.
	Active Travel	In	There could be some changes/ temporary disruptions to active travel during construction of the proposed development
	Access to services and healthcare	Out	There would be no significant impacts/ effects on access to services and healthcare, including from the influx of a non-home-based workforce. No such facilities are in the immediate vicinity of the development site.
Local Economy	Work and Training	In	There would be opportunities for the procurement of goods and services during the construction phase and construction activities will require a construction workforce. This would have benefits for human health.
Community & Lifestyle	Community sustainability, viability, cohesion, and integration	Out	No communities would be displaced to construct or accommodate the proposed development and impacts/ effects on local communities, including from the influx of a construction workforce is not expected to be significant.

Construction Phase

- 9.53. An overview of how it is considered that those health determinants scoped into the assessment are affected by the proposed development during construction, is as follows:

Natural Environment Determinants

Air Quality

- 9.54. An assessment has been made of the likely air quality effect of the proposals upon the site and surrounding area and this included the effects of the construction phase. During construction, potential impacts from construction of the Site include emissions from non-road mobile machinery (NRMM), emissions from road vehicles and construction dust associated with the construction activities. The assessment showed that significant effects as a result of NRMM emissions can thus be discounted since baseline concentrations are below the AQOs. The Impacts are negligible. In terms of construction traffic, it was noted that the site is largely within the Manchester AQMA, though impacts were also considered to be negligible. In terms of impacts from dust during construction, it was assessed that the risk to human health would be low during earthworks, construction and trackout (with no risk related to demolition). While risk to health is considered low, a series of mitigation measures were proposed and are set out in the relevant technical chapter.

Increase in the presence of pests

- 9.55. Any construction activity can result in an increase in the presence of pests such as insects, mice, rats and birds) through disturbance of habitat (including to existing sewers etc.) or through providing new sources of food and habitat, including through food brought to site by construction workers and disposed of inappropriately, or through facilities such as canteens or welfare cabins and site offices.
- 9.56. In addition to being a nuisance, pests can pose a direct danger to construction workers, or those visiting the site, as well as those living or working in surrounding areas. Of particular note are conditions such as Weil's disease or salmonellosis. Pests can also provide an issue in respect of structural components within the construction, or in relation to electrical wiring, drainage system, or thermal insulation. Bird droppings can also damage aesthetic appearance of the building.
- 9.57. It is anticipated that the significance of effect on buildings from pests during construction will be slight, with effects being temporary, direct, short term and reversible. In relation to health, effects for wider groups, as well as vulnerable groups, are also considered to be slight during the construction phase, with effects also being temporary, direct, short term and reversible.

Built Environment Determinants

Risk of Injuries and Death

- 9.58. The baseline study identifies a resident population in the wider study area and a number of physical receptors near the application site that could be affected by, or contribute to, risk of injuries and death during construction. The baseline also confirms the likely presence of a number of vulnerable groups in the wider study area. This may include children and adolescents, older people, people in poor health, people with physical and/or mental impairments and those suffering from deprivation who are statistically more likely to be involved in incidents and accidents. Contractors working on the development, as well as visitors to the site, also have the potential to be at risk.
- 9.59. Major accidents and incidents can occur for any infrastructure project, though it is anticipated that construction works related to the proposed development would not involve any particularly

dangerous operation, other than standard construction activities. Some chemicals may be present on-site during construction, though it is anticipated such risks associated with such materials will be adequately managed using ordinary construction site management practices.

- 9.60. Potential for mental health related post-traumatic stress from serious injuries and death is noted but not assessed due to lack of evidence demonstrating quantifiable causal relationship.
- 9.61. The magnitude of impact on roads and vehicles (physical receptor) in the study area from the introduction of construction traffic, changes to traffic patterns and localised increases in traffic levels would be moderate adverse, resulting in Moderate adverse effects which is significant. These effects would be temporary, direct and indirect, short-term and reversible. For the human receptors, the magnitude of impact from the introduction of construction traffic (some of which will be carrying high volumes of materials), localised increases in traffic levels and an unawareness of altered traffic movements would be Moderate adverse, resulting in temporary Moderate adverse effects for wider groups and all vulnerable groups, which is significant. These effects would be temporary, direct and indirect, and short-term. The effects would be the same for all groups, however vulnerable road users such as motorcyclists, elderly drivers, new drivers, children, pedestrians and cyclists would be most at risk.
- 9.62. The magnitude of impact at construction compound construction site from any trespass, damage or conflict would be moderate adverse for the physical receptor, resulting in Moderate adverse effects which is significant. These effects would be temporary, direct, short-term and reversible. The risk of injuries and death from unauthorised access and trespass that could result in slips, trips, falls and conflict with plant, vehicles and materials would be minor adverse, resulting in Slight adverse effects for all groups which is not significant. Unauthorised or criminal behaviour could lead to additional risks such as on-site conflicts and threats of violence. These risks would be temporary, direct and short-term. The effects would be the same for all groups.
- 9.63. The magnitude of impact of any damage, leaks and/or blocks to buried services and utility networks would be moderate adverse, resulting in Moderate adverse effects for the physical receptors. These effects would be temporary, direct and short-term and reversible. For human health, the risk of injuries or loss of life for construction workers from effects from leaks or damaged utilities would be moderate adverse, resulting in Moderate adverse effects, which is significant. No significant effects are predicted for the other wider groups or vulnerable groups. These effects would generally be temporary, direct and short-term; however, any serious injuries could have long-term effects and death would be permanent. The effects would be the same for all groups.
- 9.64. Consideration of the potential effect of wind effects has been made (see Chapter 11 on wind microclimate) and this notes that for the most part effects are considered to be not significant and with no safety exceedances. Beneficial effects have been noted - for example, conditions at Trinity Way bus stop will improve. Construction of the development will also result in the reduction of wind speeds (which at certain times can prove to be a risk to the safety of pedestrians in the area) and it is considered this will substantially reduce risk to pedestrian safety.

Daylight and Sunlight

- 9.65. Consideration of these elements was Scoped out for the construction phase - see Chapter 8 for details. In summary, owing to the evolving and changing nature of demolition and construction activities, the assessment of potential effects during demolition and construction of the Proposed Development on daylight and sunlight to surrounding properties is not modelled. Instead, a qualitative assessment is undertaken using professional judgement and experience.

- 9.66. Since the potential daylight and sunlight effects relating to demolition and construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed Proposed Development, the interim construction effects are not assessed quantitatively as it is considered that the completed Proposed Development represents the worst-case assessment in terms of likely daylight, sunlight and overshadowing.

Local Economy Determinants

Work and Training and Access to Business / Commercial Premises

- 9.67. During construction, there is the potential for disturbance to local businesses, commercial interests and property or adverse changes in access or environmental conditions. This has the potential to affect the sustainability or viability of local businesses and disrupt residents and their economic activity.
- 9.68. It is predicted there could be temporary adverse impacts for people accessing work and training in the study area from temporary works, temporary road closures or diversions and disruption to traffic flows. This could have particular impacts for people closest to the proposed works and those without access to a car that are more reliant on public transport.
- 9.69. There may be some adverse economic and employment impacts within the study area caused by changes or disruption to business activity and commuter times during the construction period. On balance, minor adverse impacts resulting in Slight adverse effects are predicted for the commercial premises in the study area, which is not significant. These effects to the physical and human receptors would be temporary, direct and indirect, short-term and reversible. The effects would be the same for all groups.
- 9.70. There will be additional temporary impacts on the Travelodge as it is immediately adjacent to the development site and the nature of this business means it may be more susceptible to disturbance, therefore Moderate adverse effects are predicted for all groups.
- 9.71. Construction of the development may generate new employment opportunities for people in the study area. This could provide financial security and contribute to self-esteem, particularly for low-income groups. Whilst the construction period would be temporary, access to skills and training for new workers, would have long-term benefits. The supply chain could also benefit from improved visibility and smoothing of the pipeline for work. On balance, minor beneficial impacts are predicted for the local economy and local workforce, resulting in Slight beneficial effects which is not significant. These effects would generally be temporary, direct and indirect; however, more permanent employment could lead to longer term benefits. The effects would be the same for all groups.

Operational Phase

- 9.72. An overview of how it is considered that those health determinants scoped into the assessment are affected by the proposed development during operation, is as follows:

Natural Environment Determinants

Air Quality

- 9.73. Consideration of air quality effects during the operational phase of the development were also made and this demonstrated that the development will have negligible impacts and thus not significant effects on the local area. The future users of the Site will not be exposed to air quality breaching the NAQO and will be compliant with the limit values. The overall effect of the Site will be "negligible".

Increase in the presence of pests

- 9.74. It is anticipated that the proposed development would be designed and constructed to the latest guidance and building regulations and risk relating to the presence of pests would be the same for any building within an urban area. As such, no additional effect on health has been identified.

Built Environment Determinants

Risk of Injuries and Death

- 9.75. While it is recognised that a major component of the design of this development is to minimise car use and traffic generation, taking a precautionary approach to assessment considers the potential for a change to traffic levels due to the development and an increase in congestion.
- 9.76. The baseline study identifies a large resident population, including several sensitive receptors and vulnerable groups within the study area that could be at increased risk of injuries and death during operation of the development, though it is to be recognised that the proposed development would be designed and constructed to the latest guidance and building regulations and risk would be the same for other urban areas.
- 9.77. Considering a precautionary approach to assessment means it is recognised that there may be an increase in traffic-related injuries and death through increased traffic and congestion in the study area. Sensitive groups are the same as those identified for the construction stage. However, on balance, any impacts from changes to roads, vehicles or public transport as physical receptors and the people that use them (human receptors) would be minor adverse, resulting in Slight Adverse effects, which is not significant. These effects would be permanent and direct. The effects would be the same for all groups.
- 9.78. As noted above, the presence of the development will also result in the reduction of wind speeds (which at certain times can prove to be a risk to the safety of pedestrians in the area) and it is considered this will substantially reduce risk to pedestrian safety. A reduction in wind speed will also make the area more comfortable to pedestrians and those waiting on public transport – this would be anticipated to result in beneficial effects in terms of wellbeing.

Daylight and Sunlight

- 9.79. Consideration was made of the impact on daylight and sunlight on sensitive properties in the area of the development, with a total of 638 windows serving 527 rooms at Old Brewery Gardens and the Travelodge assessed. In relation to the Old Brewery Gardens development, it was considered that the impact will not be significant (minor impacts only). Impacts on the Travelodge are also considered to be minor adverse, with particular note made that this building is used as a hotel and therefore provides short term residential accommodation for commercial purposes (with a therefore 'transient' population), meaning its sensitivity to change is low and all of the rooms impacted are bedrooms.

Local Economy Determinants

Work and Training and Access to Business / Commercial Premises

- 9.80. The proposed development will lead to an increased population in the area, with anticipated increased in footfall to local businesses and increased economic activity. This would be manifested for those new proposed businesses within the development, but also across the wider area. Local jobs provision is likely to increase through the development of new businesses within the proposed development and opportunities for training and work experience. It is anticipated that beneficial effects on health will be slight but will likely be experienced across all population groups.

Mitigation measures

- 9.81. The human health assessment, being partly based upon residual effects identified by other topic assessments, will incorporate the embedded and additional mitigation measures identified in those chapters e.g. Air Quality. Scheme construction will be carried out in accordance with best practice and relevant legislation pertaining at that time. A Construction Method Statement will set out work activities and controls in place to ensure that risk to health and wellbeing is removed or mitigated appropriately. These measures will also be complemented and strengthened by a range of mitigation to be detailed in both a Construction Environment Management Plan (CEMP) and Construction Traffic Management Plan. Best practice and identified mitigation measures will be captured in these documents to prevent, reduce and offset significant adverse environment effects where possible. The document and the roles/responsibilities and assurance processes that are laid out within these documents will form the principal mechanism by which mitigation measures from this EIA will be secured.
- 9.82. A range of mitigation measures specific to potential effects identified in relation to the construction and operation of the proposed development are included in Chapter 12.
- 9.83. While the proposed mitigation to be enacted during the construction works will reduce or nullify anticipated impacts on health and wellbeing, it is the case that as detailed design has not been completed and a contractor has not been appointed, there may be a number of unforeseeable hazards and risks, or other impacts to health and wellbeing that may only materialise at a later date. Such hazards and risks would be assessed as and when they are identified. A hazard register will be prepared, and measures taken either in design or in procedural operations to mitigate against the hazard. This process will be undertaken in close liaison with the Environmental Health Officers of the local authority (Manchester City Council).
- 9.84. In addition, it is worth noting that the proposed development will be designed with sustainability in mind and a key element of sustainability relates to people and the society and environment in which they live. Inclusive environments require well-connected communities that make residents feel safe, secure and healthy. The design will use Secured by Design and Healthy Streets principles to shape the landscape and urban design. Consideration has been given to good access to walking, cycling and public transport. The applicant has submitted an outline travel plan with the planning application and is committed to a full travel plan prior to occupation, and which is envisaged will be secured by the LPA through a planning condition. The project will also use the Transport for New Homes checklist. All homes will have access to key community facilities and amenities, as most of them are already located in the area or will be introduced within the commercial space. The project will follow Building for a Healthy Life (BfHL) principles in relation to transport, facilities and services and homes for everyone.
- 9.85. Further, health and wellbeing will be enhanced via the creation of happier places to live. While not all apartments will be provided with private outdoor space of 5m², access within 200m of each home to spacious outdoor amenity is included in the design in the form of both green terrace roofs and a public garden. Furthermore, just slightly beyond the 200m mark are the Cathedral Gardens. Other nearby green space includes that located outside the Urbis building by Cheetham's Library, alongside the River Irwell, and beside The Friars primary school.
- 9.86. Indoor environments are specified to meet standards for noise / sound and fit-out material quality (e.g. low Volatile Organic Compounds). An overheating assessment has been carried out on the sample of flats most likely to be affected by overheating, which is more than 5%, and this has shown compliance with CIBSE TM59 standard²⁵. A risk assessment is also to be conducted in relation to control of infection spread.

- 9.87. An overview of proposed mitigation in relation to those impacts identified as potentially significant is as follows (note that specific mitigation relating to specialist technical assessments is contained within the relevant Chapters):

Risk of Injuries and Death (Construction Phase)

- 9.88. Consultation will take place with the relevant Officers in Manchester City Council, regarding any road closures, diversions etc. A Construction Traffic Management Plan will be prepared to allow ongoing access where possible and minimise potential disruption and severance for communities nearby. This will include overnight and weekend closures where possible.
- 9.89. Any such works will be consulted upon with local residents or facilities that are likely to be affected by the works to direct users during construction and support access to local facilities.
- 9.90. With appropriate mitigation measures in place to minimise the risk of injuries and death including, for example, use of best practice construction techniques and implementation of a Construction Traffic Management Plan, no significant effects are predicted for the physical and human receptors.
- 9.91. Site compounds would be established in accordance with a strict Construction Methodology, adhering to all appropriate standards and which includes the establishment of traffic management systems and appropriate, safe access. Plant and equipment would be safely delivered to site, outside of peak hours, as required depending on the stage of the works and securely stored.
- 9.92. Compounds would be made fully secure with on-site security, appropriate security fencing and lighting installed to provide visibility for onsite security staff. Mobile welfare would also be available.
- 9.93. With these measures in place, it is not predicted there would be any significant effects on the physical or human receptors.
- 9.94. All clearance and construction work, including works potentially affecting electricity, gas, water and sewage supplies will be undertaken under the applicable Health and Safety legislation and best practice guidance pertaining at that time.
- 9.95. Utility diversion works will be managed in accordance with the appropriate legislation and guidelines applicable at that time.
- 9.96. The Construction Management Plan will detail the arrangements for responding to the unexpected discovery of utilities - even if utilities have not been identified in any surveys. This should include emergency contact details for all utilities operating in the location of construction and arrangements for isolating and securing the affected area.
- 9.97. With appropriate mitigation measures in place to minimise the risk of injuries and death, no significant effects are predicted for the physical and human receptors.

Transport options and active travel (Construction Phase)

- 9.98. Provision of a Construction Traffic Management Plan to ensure that if required, diversions are in place and are set up in accordance with relevant guidance in relation to signage etc. Inclusion of temporary bus stops if required. Liaison with bus operators to explore temporary timetables if required. Liaison with local communities to ensure any changes to public transport are communicated well in advance.
- 9.99. Work and Training and Access to businesses / commercial premises (Construction Phase)
- 9.100. Liaison with local business owners to ensure any changes to access are communicated well in advance and arrangements made to maintain access.

Cumulative effects

- 9.101. Cumulative effects can include intra-scheme impacts and inter-scheme impacts. Intra-scheme impacts are where in-combination impacts arise from the Scheme. Inter-scheme impacts occur due to impacts from more than one scheme. The population and human health assessment is by nature an in-combination assessment of the population and human health impacts resulting from the environmental effects of the Scheme.
- 9.102. Potential intra-scheme effects may occur from interaction with other technical disciplines. From consideration of the assessments of those other technical disciplines and the mitigation measures proposed, in respect of the wider population and the vulnerable groups identified, it is anticipated that there will be no significant cumulative effects on health and wellbeing during both the construction and operation of this development.
- 9.103. Inter-project cumulative effects may occur from interaction with other proposed developments (Reasonably Foreseeable Future Projects (RFFPs) located near the Scheme. When combined with the works in the Scheme area these could potentially cumulatively affect sensitive receptors. However, through consideration of inter-project cumulative effects in the context of mitigation that would be applied via the planning regime, alongside the wider spatial context of this being a heavily urbanised area, it is anticipated that there would be no significant adverse inter-project cumulative effects on health and wellbeing.

Summary of significant residual effects

- 9.104. While a range of potential impacts have been identified that could have significant effects on population health and wellbeing, it is considered that these can be mitigated appropriately and no significant effects are anticipated after the mitigation has been implemented, either during construction or operation. Note that residual effects for specific technical assessments such as Air Quality, are detailed within the relevant sections to the ES.

Table 9.7 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Risk of injury and death – construction traffic	Wider groups & all vulnerable groups	Consultation will take place with the relevant Officers in Manchester City Council, regarding any road closures, diversions etc. A Construction Traffic Management Plan will be prepared to allow ongoing access where possible and minimise potential disruption and severance for communities nearby. This will include overnight and weekend closures where possible. Any such works will be consulted upon with local residents or facilities that are likely to be affected by the works to direct users during construction and support access to local facilities.	Construction Traffic Management Plan	Slight adverse (not significant) Temporary, direct, short-term and reversible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
		With appropriate mitigation measures in place to minimise the risk of injuries and death, no significant effects are predicted for the physical and human receptors.		
Risk of Injury and death – trespass to site compounds	Wider groups & Vulnerable group of children and adolescents	Site compounds would be established in accordance with a strict Construction Methodology, adhering to all appropriate standards and which includes the establishment of traffic management systems and appropriate, safe access. Plant and equipment would be safely delivered to site, outside of peak hours, as required depending on the stage of the works and securely stored. Compounds would be made fully secure with on-site security, appropriate security fencing and lighting installed to provide visibility for onsite security staff. Mobile welfare would also be available. With these measures in place, it is not predicted there would be any significant effects on the physical or human receptors.	Construction Method to adhere to appropriate standards	Slight adverse (not significant) Temporary, direct, short-term and reversible
Risk of Injury and death – utilities and buried services	Wider groups – contractors working on development	All clearance and construction work, including works potentially affecting electricity, gas, water and sewage supplies will be undertaken under the applicable Health and Safety legislation and best practice guidance pertaining at that time. Utility diversion works will be managed in accordance with the appropriate legislation and guidelines applicable at that time. The Construction Method Statement will detail the arrangements for responding to the unexpected discovery of utilities - even if utilities have not been identified in any surveys. This should include emergency contact details for all utilities operating in the location of construction and arrangements for isolating and securing the affected area.	Construction Method to adhere to appropriate standards	Slight adverse (not significant) Temporary, direct, short-term and reversible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
		With appropriate mitigation measures in place to minimise the risk of injuries and death, no significant effects are predicted for the physical and human receptors.		
Transport Options & Active Travel - Health outcome from temporary closure, modification, diversion or disruption to local roads and routes Disruptions to normal activities / journeys	Wider groups	Provision of a Construction Traffic Management Plan to ensure that if required, diversions are in place and are set up in accordance with relevant guidance in relation to signage etc. Inclusion of temporary bus stops if required. Liaison with bus operators to explore temporary timetables if required. Liaison with local communities to ensure any changes to public transport are communicated well in advance.	Traffic Management Plan	Slight adverse (not significant) Temporary, direct, short-term and reversible
Work & Training - Access	Wider groups	Liaison with local business owners to ensure any changes to access are communicated well in advance and arrangements made to maintain access.	Communications Plan	Slight adverse (not significant) Temporary, direct and indirect, short-term
Operational Phase				
N/A	N/A	N/A	N/A	N/A

Reference List

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

- Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework available at: [National Planning Policy Framework \(publishing.service.gov.uk\)](https://www.gov.uk/government/publications/national-planning-policy-framework)
- Department for Communities and Local Government (2021) Planning Practice Guidance available at: <https://www.gov.uk/government/collections/planning-practice-guidance>
- Marmot, M. (2010) Fair society, healthy lives: the Marmot Review: strategic review of health inequalities in England post-2010. ISBN 9780956487001
- Department of Health (2012) Health and Social Care Act
- Public Health England (2016) Public Health Outcomes Framework 2016-19 available at: <https://www.gov.uk/government/collections/public-health-outcomes-framework>
- Local Authority Health Profile (2018) – Public Health England
- Manchester City Joint Health and Wellbeing Strategy 2016
- Public Health England – Local Health Local Health - Public Health England - Local Health - Public Health England - Reports: get a dashboard on a custom area See also Manchester Health & Care Commissioning Neighbourhood Profile

- Public Health England – Local Health Local Health - Public Health England - Local Health - Public Health England - Reports: get a dashboard on a custom area See also Manchester Health & Care Commissioning Neighbourhood Profile
- World Health Organisation (2018, December) Adolescents: health risks and solutions (<https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions>)
- Child Accident Prevention Trust (2013) Child death from road traffic accidents (<http://makingthelink.net/child-deaths-road-traffic-accidents>)
- World Health Organisation (2018) Air pollution and child health: prescribing clean air (<https://www.who.int/ceh/publications/air-pollution-child-health/en/>)
- World Health Organisation Data and statistics (<http://www.euro.who.int/en/health-topics/environment-and-health/noise/data-and-statistics>)
- Agency for Toxic Substances and Disease Registry (2015, October) (<https://www.atsdr.cdc.gov/odors/faqs.html>)
- British Medical Journals, Wickham. S, Anwar. E, Barr.B, Law. C, Taylor-Robinson.D (2016, July) Poverty and child health in the UK: using evidence for action (<https://adc.bmj.com/content/101/8/759>)
- Parliamentary Office of Science and Technology (2007, January) (<https://www.parliament.uk/documents/post/postpn276.pdf>)
- Transport for London (2013, April) Older Pedestrians and Road Safety, Research Debrief (<http://content.tfl.gov.uk/older-pedestrians-research-report.pdf>)
- Asher. L, Aresu. M, Falaschetti. E, Minell. J (2012) Most older pedestrians are unable to cross the road in time: a cross-sectional study (<http://ageing.oxfordjournals.org/content/41/5/690.full.pdf+html?sid=4b5142fa-92a1-4cd5-80b1-4eb35701432e>)
- Shrestha.B.P, Millonig.A, Hounsell.N.B, McDonald.M (2017) Review of Public Transport Needs of Older People in European Context (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5656732/>)
- https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/reports-and-briefings/active-communities/rb_june15_the_future_of_transport_in_an_ageing_society.pdf (page 10)
- House of Commons Briefing Paper (2018, October) Access to transport for disabled people, Number CBP 601 (<https://researchbriefings.files.parliament.uk/documents/SN00601/SN00601.pdf>)
- DEFRA UK AIR, Air Information Resource, Effects of air pollution (<https://uk-air.defra.gov.uk/air-pollution/effects>)
- Asthma UK (<https://www.asthma.org.uk/advice/triggers/pollution/>)
- Munzel T, Schmidt FP, Steven S, Herzog J, Daiber A, Sorensen M. Environmental Noise and the Cardiovascular System. J Am Coll Cardiol. 2018;71(6):688-97 (Extract from Journal of the American College of Cardiology 2018; <http://www.intuition-physician.com/wp-content/uploads/2018/05/Environmental-Noise-and-Cardiovascular-Health.pdf>)
- TM59 Design Methodology for the Assessment of Overheating Risk in Homes, Chartered Institution of Building Services Engineers (CIBSE), 2017, <https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q0000000DvrTdQAL>.



	Figure:	X9.1		
	Title:	Determinants of Health model (from Barton and Grant 2010)		
	Project:	Boddingtons		
	Date:	December 2021	Scale:	NTS

Townscape and Visual Impact

Introduction

- 10.1. This Chapter of the ES has been prepared by Barton Willmore LLP and assesses the potential impacts and likely effects of the Proposed Development on the townscape character and visual amenity of 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 adverse impacts and the likely residual impacts after these mitigation measures have been adopted.
- 10.2. The Chapter has been prepared by Rob Griffiths and Greg Mahon, both of whom hold a Masters in Landscape Planning and Management, over 15 years' experience in preparing Landscape/Townscape and Visual Impact Assessment for EIA developments, are Chartered Members of the Landscape Institute (CMLI) and are Practitioners of Institute of Environmental Management and Assessment (PIEMA).
- 10.3. This Chapter, and its associated figures and appendices (outlined below), is intended to be read as part of the wider ES with particular reference to the introductory Chapters of this ES (Chapters 1 - 4).
- 10.4. This Chapter is supported by the following figures that provide additional baseline information upon which the assessment of townscape and visual effects are based and are presented in Appendix 10.2:
 - Figure 10.1: Site Context Plan;
 - Figure 10.2: Topography Plan;
 - Figure 10.3: Building Heights Plan;
 - Figure 10.4: Townscape Character Plan;
 - Figure 10.5: Site Appraisal Plan; and
 - Figure 10.6: Visual Appraisal Plan.
- 10.5. This Chapter is supported by the following appendices provided in Volume 2 of the ES:
 - Appendix 10.1: Planning Policy;
 - Appendix 10.2: Baseline Conditions;
 - Appendix 10.3: Visuals and the Townscape and Visual Methodology;
 - Appendix 10.4: Townscape Assessment;
 - Appendix 10.5: Visual Assessment; and
 - Appendix 10.6: Cumulative Assessment
- 10.6. Baseline views are presented in Appendix 10.2. The Visualisations (baseline, with proposed development and cumulative) and methodology are found in Appendix 10.3

Scope of the Assessment

- 10.7. This section provides confirmation on the scope of the assessment presented within this Chapter following agreement with MCC) through pre-application discussions.
- 10.8. The assessment is supported by 10 verified views which were agreed with MCC during pre-application discussions, with three fully rendered views and 7 wireline views. The verified views were produced by Assael Architects and are presented in Appendix 10.2, the verified cumulative views agreed with MCC through pre-application discussions to be presented from the same representative viewpoint locations are presented Appendix 10.3 which also includes the methodology for the production of verified views.

Extent of the Study Area

- 10.9. The study area was determined through the consideration of the existing influence and visibility of the Site, as well as the anticipated influence of the Proposed Development on townscape character and visual amenity, by means of both desk study and field study and was agreed with MCC through pre-application discussions.
- 10.10. The extent of the study area is shown in Figure 10.1 Site Context Plan.

Legislative and Policy Context

- 10.11. A Summary of the legislation and policy is set out below, with full consideration of published policy relevant to the Site and Proposed Development set out within Appendix 10.1

Legislation

- 10.12. There is no legislation that is relevant to the consideration of the townscape and visual effects arising from the Proposed Development. However, this chapter has been prepared in line with best practice set out by the Landscape Institute and Institute of Environmental Management and Assessment in Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3).

National Planning Policy and Guidance

National Planning Policy Framework

- 10.13. Within the National Planning Policy Framework (NPPF), guidance for local authorities' decision making identifies the need to approach Proposed Development in a positive and creative way, working proactively with applicants to make effective use of land, while securing the protection, enhancement and creation of multifunctional Green Infrastructure assets. The NPPF also highlights that development should take consideration of opportunities to improve the quality and character of an area as well as protecting and enhancing valued landscapes.

National Planning Practice Guidance

- 10.14. Planning Practice Guidance (PPG) supports the use of landscape and townscape character assessment to understand local distinctiveness and sets out that local plans should promote local character as well as an understanding of the context within which development sites lie.

Local Planning Policy

- 10.15. The Core Strategy outlines MCC's vision for Manchester in 2027 along with the planning policies which will be used to deliver that vision. The Core Strategy policies that are considered relevant to the Site and the Proposed Development include:
 - Policy SP1 Spatial Principles;
 - Policy CC 6 City Centre High Density Development;

- Policy CC 9 Design and Heritage;
- Policy EN 1 Design Principles and Strategic Character Areas;
- Policy EN 2 Tall Buildings;
- Policy EN 3 Heritage;
- Policy EN 8 Adaption to Climate Change; and
- Policy EN 9 Green Infrastructure.

Local Regeneration Frameworks

Great Ducie Street Strategic Regeneration Framework (2018)

- 10.16. The Site is located within the area covered by the Great Ducie Street SRF, which wraps around (but does not include) the Site. The SRF aims to deliver development that focuses on Sustainability and Resilience to reduce carbon emissions and impacts on air quality, increase development densities and economic growth by promoting Density and Place-Making. It aims to front development onto the River Irwell to take advantage of the natural asset, create Active Frontages and improve Access and Movement.

Boddingtons Strategic Regeneration Framework (2015) and Addendum (2019)

- 10.17. The Site is located within the Boddingtons SRF, which sits between a number of key regeneration areas, including NOMA, Strangeways and Victoria Station, on the northern edge of Manchester City Centre. The Boddingtons SRF aims to guide the re-development on the site, which is considered to be acceptable in planning terms.
- 10.18. The 2019 addendum to the Boddingtons SRF sets out that development within the SRF area should take reference from existing and emerging development in the vicinity and recognises that the five tall residential buildings of the Old Brewery Gardens approval establishes a form of development along the north-eastern edge of the study area of up to 28 stories from ground level.

Assessment Methodology and Significance Criteria

- 10.19. The townscape and visual assessment methodology has been drawn from best practice guidelines comprising the Guidelines for Landscape and Visual Impact Assessment. The aim of these guidelines is to set high standards for the scope and content of landscape/townscape and visual impact assessments and to establish certain principles that will help to achieve consistency, credibility, transparency and effectiveness throughout the assessment.
- 10.20. The assessment of townscape and visual effects, in common with the assessment of many environmental effects, includes a combination of objective and subjective judgements, and it is therefore important that a structured and consistent approach is adopted to ensure that the assessment undertaken is as objective as possible.
- 10.21. A townscape assessment is the systematic description and analysis of the features within the townscape, such as landform; vegetation cover; settlement pattern and morphology; transport patterns; land use; materiality; and scale/form of built elements; which together create a particular sense of place.
- 10.22. A visual assessment considers visual receptors, which are the viewers of and within the townscape, with the representative viewpoints selected in consultation with the local planning authority and informed by professional judgement.

Reporting of the Environmental Effect and Significance Criteria

- 10.23. The assessment of likely significant environmental effects as a result of the Proposed Development has taken into account the construction and operational phases.

Determining Sensitivity of Receptor

- 10.24. The assessment of townscape value is based on a combination of the importance of townscape-related planning designations and, as appropriate, such attributes as scenic quality, condition, perceptual aspects, rarity, representativeness, recreation and association. The overall value for each townscape receptor is categorised as High, Medium, Low or Very Low. The assessment of visual value is based upon the importance of the location of the view, its designations, cultural associations and the amount to which the view forms part of the experience in the location. The overall value for each visual receptor is categorised as High, Medium, Low or Very Low and is informed by professional judgement supported by reasoned argument.
- 10.25. Townscape susceptibility is categorised as High, Medium or Low. The following criteria are taken into consideration in the assessment of townscape susceptibility: landform, pattern/complexity, composition, land-cover and relationship to existing settlements or developments. However, not all criteria are equally applicable or important within a given townscape / type of development proposed and professional judgement is applied.
- 10.26. Visual susceptibility to the type of change proposed is based upon the activity or expectation of the viewer. It is categorised as High, Medium or Low. Where people are in their homes or engaged in outdoor recreation focussed on the townscape visual receptors may have a high susceptibility, whilst it may be low for those engaged in work or travelling on major roads.
- 10.27. The sensitivity of a receptor is a combination of the value of the resource and the susceptibility of the receptor to the type of change proposed; that is the capacity for the receptor to accommodate the Proposed Development and categorised as High, Medium or Low and is informed by professional judgement.

Determining the Magnitude of Change

- 10.28. The townscape magnitude of effect (change) is informed by judgements about the precise nature of the change brought about by the Proposed Development both in terms of the existing townscape character and townscape elements / features and the addition of new townscape elements / features, and its duration and reversibility and is categorised as Large, Medium, Small, Very Small and None.
- 10.29. In the evaluation of the effects on views and the visual amenity of the identified receptors, the magnitude of visual effect (change) is typically described with reference to:
- The scale of change in the view with respect to the loss or addition of features in the view and changes in its composition. Factors contributing to this include:
 - The angle of view in relation to the main activity of the receptor;
 - The distance of the viewer from the Proposed Development;
 - The proportion of the view affected, and
 - The extent of the area over which the changes would be visible.
 - Whether or not the view is experienced in fixed or transient views and, in the latter, whether it is intermittent/glimpsed or continuous; and
 - The duration of the change, whether temporary or permanent.

10.30. Visual magnitude is categorised as Large, Medium, Small, Very Small and None.

Determining the Level of Effect

10.31. The level of effect attributed has been assessed based on the magnitude of change due to the Proposed Development and the evaluation of the sensitivity of the affected receptor, as well as a number of other factors that are outlined in more detail in Chapter 2: Approach to EIA. The level of effect has been based on of professional judgement and reasoned argument, with Table 10.1 used as a tool that has assisted with this process.

Table 10.0.1: 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 Adverse/Beneficial	Minor Adverse/Beneficial
Minor	Moderate-Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor-Negligible
Negligible	Negligible	Negligible	Negligible

10.32. Whilst Table 10.1 provides ranges, the level of effect is confirmed as a single level and not a range, informed by professional judgement. For each effect, it has been concluded whether the effect is 'beneficial' or 'adverse'. A statement is also made as to whether the level of effect is 'Significant' or 'Not Significant', again based on professional judgement.

10.33. The following terms have been used to define the significance of the effects identified and these can be 'beneficial' or 'adverse':

- **Major effect:** where the Proposed Development is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This effect is considered to be 'Significant';
- **Moderate effect:** where the Proposed Development is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This effect is considered more likely to be 'Significant' but will be subject to professional judgement;
- **Minor effect:** where the Proposed Development is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the Proposed Scheme is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This effect is considered less likely to be 'Significant' but will be subject to professional judgement; and
- **Negligible/Neutral:** where the Proposed Development is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity / or there is a considerable change at a receptor which is not considered sensitive to a change. This effect is 'Not Significant'.

Limitations and Assumptions

- 10.34. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- The baseline assessment has been based on information readily available at the time of undertaking;
 - During site visits to the Site and surrounding area, weather conditions, the time of day and seasonal factors have influenced the visual assessment and photographic record of the environment;
 - Access to private properties has not been obtained and the visual assessment will be conducted in line with best practice set out within GLVIA3; and
 - The construction phase of the Proposed Development will be assessed with mitigation provided in Chapter 5 which includes details of measures to be delivered as part of a CEMP.

Baseline Conditions

Desk Study

- 10.35. A detailed desktop analysis of landscape policy, mapping, published character assessments and evidence base was undertaken to inform the baseline evaluation of both townscape character and visual amenity. The baseline conditions of the Site are shown in Appraisal Photographs A-L in Appendix 10.2 and their locations are shown in Figure 10.5 in Appendix 10.2. The context of the Site and its setting is shown in Figure 10.1, the topography of the townscape in the vicinity of the Site is shown in Figure 10.2 and the existing building heights are shown in Figure 10.3 in Appendix 10.2.

Land Use and Pattern

- 10.36. The Site is comprised of an area of hardstanding to the east of Great Ducie Street, which is broadly square in shape, although the north-west corner of which is occupied by the Travelodge building. The Site is currently utilised as surface car parking, the northern boundary of which is defined by the Travelodge building and a retaining wall along Francis Street. The eastern boundary of the Site is formed by a retaining wall that separates the Site from the change in levels between the area of car parking and the higher land to the east. The southern boundary of the Site is formed by the construction site for the Manchester City College building, and the eastern boundary of the Site is formed by a palisade fence along the footway of Great Ducie Street. The Site and pattern of immediate townscape is shown in Figure 10.5 in Appendix 10.2.

Access Routes and Rights of Way

- 10.37. Vehicular and pedestrian access to the Site is obtained from Francis Street to the north at the entrance to the car park, and pedestrian access to the site is obtained through a gate in the palisade fence along Great Ducie Street on the western Site boundary.

Designations

- 10.38. The Site is not covered by any landscape or townscape designations. However, the Manchester Cathedral Conservation Area lies approximately 400m south of the Site, physically separated from the Site by the A6042, railway lines and existing built form on intervening land.

Vegetation

- 10.39. The Site is devoid of vegetation. However, a small area of self-set ruderal and overgrown scrubby vegetation within an area of disused land that lies immediately adjacent to the eastern Site boundary.

Published Character

- 10.40. At a national scale, the Site lies within National Character Area (NCA) 55: Manchester Conurbation. At a local level, the Site is located on the boundary of the City Centre Strategic Character Area and the Central Area of Change Strategic Character Area, as shown in Figure 7.4 in Appendix 7.2. The key characteristics of the published character areas is set out within Appendix 7.2.

Field Study

- 10.41. Field surveys were undertaken in October 2021 to verify the desktop review of the baseline townscape character and visual amenity, and in order to inform the determination of effects upon the townscape resource and visual amenity witnessed by visual receptors as a result of the Proposed Development and to determine the study area.

Site Character

- 10.42. The Site comprises an area of land utilised as a surface level car park east of Great Ducie Street since the demolition of the former Boddingtons Brewery, as shown in Site Appraisal Photographs A-E in Appendix 7.2. The southern edge of the Site lies adjacent to the new Manchester College site, which is under construction. An existing Travelodge building is located on the north-western corner of the Site and combines with the under construction college to partially enclose the at grade car park, as shown in Site Appraisal Photographs A-L in Appendix 10.2. The wider context of the townscape in the vicinity of the Site is influenced by predominantly commercial and light industrial development south of the historic Strangeways Prison and north of the River Irwell.
- 10.43. The Site is set within the Boddingtons SRF, which accepts the principle of development and that the scale and massing of buildings on the Site should respond to the scale and massing of both existing and emerging buildings in the surrounding area.
- 10.44. The existing height and massing of development in the vicinity of the Site is fragmented with the surface level car park contributing to the perception of a partial void within the townscape as shown in Site Appraisal Photographs I, J and L in Appendix 10.2. Large gaps within the street frontage contribute to the fragmented and somewhat marginalised sense of place amongst the low rise development to the north and west, where building heights are up to seven storeys. To the south and east, building heights range up to 55 storeys and contribute to a definite sense of place associated with the city centre location.
- 10.45. The Site is situated on the edge of the city centre and set within an urban area where it is influenced by noise and movement from vehicular and rail traffic as well as other activities that are typical of the city centre location. The Site exhibits a declining condition with inconsistent surface and boundary treatments creating a low-quality public realm with an inactive frontage onto Great Ducie Street. The Site provides limited physical and visual accessibility and does not exert a strong sense of place or identity.

Visual Baseline

- 10.46. The Site is located within an urban area at the edge of the city centre and is set within the context of a variety of built forms that range in scale and height. Views available in the vicinity of the Site are characterised by the existing townscape, with taller buildings in the wider townscape forming vertical skyline features in horizontal views such as those along boulevards such as the A4062.

Views towards Manchester city centre from north of the Site are orientated and articulated by the taller buildings such as the collection of blocks at Deansgate Square of up to 65 storeys in height, creating a gateway to Manchester on the southern bank of the River Irwell.

- 10.47. Views north towards the Site from Manchester city centre, including those from the Manchester Cathedral Conservation Area, demonstrate a decreasing scale and mass of built form moving away from the city centre.
- 10.48. The Site exhibits a weak visual character due to the discordant nature of elements within and along the boundaries. Car parking infrastructure generates clutter in views available from within the Site as shown in Site Appraisal Photographs A-E in Appendix 10.2, as well as within views into the Site from areas immediately adjacent to it such as those shown in Site Appraisal Photographs F-L in Appendix 10.2, where the palisade fencing, car parking signage and cars combine with the construction compound immediately adjacent to the Site to provide a reduced visual amenity experience.
- 10.49. The Site is partially visible in close range views where the large gap between the Travelodge building and the under construction Manchester College building does not contribute positively to the street frontage along Great Ducie Street as shown in Site Appraisal Photographs I, J and L in Appendix 7.2. The existing Site does not exhibit any recognisable townscape features that contribute to a positive visual experience in views when travelling along Great Ducie Street, Francis Street or the A4062.
- 10.50. In longer views from the wider townscape of Manchester, the existing built form and topography surrounding the Site is typical of the urban grain exhibited by a large built up area and limits views towards the Site, preventing any views of the ground plane of the Site. Baseline views from the wider townscape are shown in Appendix 10.1 and the Site Context Photographs 1-10 in Appendix 10.3 Visuals and Townscape and Visual Methodology.

Identification and Evaluation of Significant Effects

- 10.51. This section summarises the key likely townscape and visual effects that are anticipated to arise as a result of the Proposed Development, focussing on those receptors considered likely to experience significant effects as a result of the Proposed Development at either assessment phase. The full consideration of townscape effects is set out within Appendix 7.4: Townscape Assessment, and a full assessment of visual effects is set out within Appendix 7.5: Visual Assessment.

Construction Phase

- 10.52. The principal activities that will have an effect upon townscape character and visual amenity during the construction phase include:
- The demolition of the existing elements on the Site, including ground breaking and excavation;
 - The introduction of new temporary elements, including material stockpiles, welfare facilities, plant and machinery (including drilling/piling equipment and tall cranes), and lighting;
 - The movement of plant and machinery within the Site and the surrounding townscape, including crane activities; and
 - The building and emergence of new built forms around areas of public realm.
- 10.53. The construction phase is anticipated to take approximately three years (refer to Chapter 5) and therefore any visual impacts as a result of the construction phase is temporary in nature.

Townscape Effects

Townscape Character Area 1: Strangeways

- 10.54. The temporarily introduced tall plant and machinery, material stockpiles and welfare facilities of the construction activities for the Proposed Development will be evident on the site alongside existing disturbance created by traffic on A56 Great Ducie Street. Cranes and construction activities are typical features seen within an urban setting when development is under construction and the temporary construction phase of the Proposed Development will not overtly alter the urban setting of TCA 1. The temporary construction phase of the Proposed Development will be imperceptible from some parts of the TCA due to the enclosure created by the long unarticulated walls of commercial scale units and the high walls of Strangeways Prison. The construction phase of the Proposed Development will cause a Small magnitude of effect that will result in a Minor Adverse effect upon the setting of this TCA where the construction activities are perceptible.

Townscape Character of the Site

- 10.55. The temporarily introduced tall plant and machinery, material stockpiles and welfare facilities of the construction activities for the Proposed Development will be evident on the Site alongside existing disturbance created by traffic on A56 Great Ducie Street. The urban setting of the Site will be modified from a surface level car park to a construction site where additional ground level and elevated movement and noise will combine with traffic on adjacent roads to generate additional disturbance on the Site. The construction phase of the Proposed Development will cause a Large magnitude of effect that will result in a **Major Adverse** effect upon the character and immediate setting of the Site. This is considered to be **significant but temporary in nature**.
- 10.56. Whilst the temporary construction phase of the Proposed Development on the Site will introduce detracting elements for a period of three years, the construction activities will signify the future aspirations for regeneration of the Site that will follow the construction activities and achieve a positive lasting legacy. The success of urban renewal and rejuvenation comes with this cost attached in townscape character and visual amenity terms. However, whilst the construction works will be incongruous in the townscape, a degree of positive connotations will be attached with the works (in relation to the urban regeneration that they will signify), and it would be remiss not to also acknowledge this.

Visual Effects

- 10.57. The Visual Assessment is based upon Site Context Photographs 1 - 10 in Appendix 10.2, and verified views of the Proposed Development shown in Wirelines 1-10 in Appendix 10.3, which are representative of views experienced by the various visual receptors in the vicinity of the Site. The views where effects are considered likely to be significant are presented in this chapter with the full assessment of all 10 views presented in Appendix 10.5. Out of the 10 representative viewpoints agreed with MCC and assessed in Appendix 10.2, effects upon visual receptors at two locations are considered to be significant (either at construction phase, operational phase or both phases) effects on receptors at the other eight agreed viewpoints ranging from Negligible Adverse to Minor Adverse and non-significant. Discussion on these eight non-significant viewpoints is found within the Appendices.

Viewpoint 4: View east from A6042 Ring Road

- 10.58. The temporary construction phase of the Proposed Development will be partially visible in views north along Victoria Street with the tall construction elements visible between the Embankment Towers and Manchester Arena. Cranes and tall plant will be seen across a horizontal extent of

views along Victoria Street although ground level activities will be screened from view by intervening built form. The temporary construction activities will be seen as part of a view along a highway boulevard within a city centre where elements of the urban environment such as built form and construction activities are typical. Therefore, the Proposed Development will cause a Small magnitude of effect, which will result in a **Minor Adverse** significance of effect upon the Low sensitivity receptors. This is **not considered to be significant**.

Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road

- 10.59. The temporary construction phase of the Proposed Development will be partially visible in views south-east along Great Ducie Street where part of the ground level construction activities will be screened by the Travelodge building. However, those ground level construction works occurring in the eastern-most part of the Site will be visible along the highway corridor where views are channelled along the road. The temporary construction activities will be seen as part of a view towards the city centre where elements of the urban environment such as tall buildings and construction activities are typical. The temporary construction activities will not alter the context of views along the highway where the road corridor and highway infrastructure will remain the predominant focus with any construction activities of the Proposed Development being seen at close range against the skyline in views towards the city centre. Nonetheless, there will introduce new vertical elements to the view. Therefore, the Proposed Development will cause a Medium magnitude of effect, which will result in a **Moderate Adverse** significance of effect upon the Low sensitivity receptors. This is considered to be **significant, albeit temporary in duration** with the construction activities signifying the future aspirations for regeneration that will follow the construction activities and achieve a positive lasting legacy in views towards the city centre.

Operational Phase

- 10.60. The description of the Proposed Development is provided in Chapter 4. The principal elements that will have an effect upon townscape character and visual amenity during the Operational Phase include:
- Introduction of new residential development comprising of two buildings with maximum heights of 11 stories for Building A and 27 stories for Building B;
 - Introduction of a new public park and non-vehicular access through the Site; and
 - Introduction of a podium level roof garden.

Townscape Effects

Townscape Character Area 1: Strangeways

- 10.61. At Completion, the Proposed Development will form a gateway feature within TCA 1, where it will reflect the more vertical elements of built form on the south-west of the River Irwell, creating a transition between the organic townscape of the city centre and the unarticulated industrial built form. The Proposed Development will replace an area of townscape that is in poor condition with a well-considered built form that contributes positively to the townscape, where the brick elevations rationalise the heritage of industrial buildings in the city with precast cills and deep reveals on the windows railings on balconettes. The delivery of articulated facades with consistent exterior materiality that utilises the same bricks with different coloured mortar, pale pink and amber detailing around windows and a strong frontage onto Great Dulcie Street created by piers and recessed windows, will combine with the adjacent Manchester College to create a distinctive sense of place.
- 10.62. The considered configuration of the massing arrangement for the Proposed Development creates a physical and visual permeability between the defined development blocks, thus helping to

reduce their perceived massing and introduce a positive contribution to the skyline that will help to enhance wayfinding by sign-posting the transition between Great Dulcie Street and the city centre. The Proposed Development will also deliver improved public realm with increased public accessibility by connecting the Site to Francis Street north of the Site, A6042 south of the Site and Great Dulcie Street west of the Site. The Proposed Development will improve connections through the public realm to the adjacent Brewery Gardens site.

- 10.63. The landscape strategy for the Site will create a new public space that contributes to the green infrastructure of the wider TCA 1 with tree lined accessible routes and a public park. The Proposed Development will provide improvements to part of TCA 1 that are considered to be a partial change to the townscape and will cause a Medium magnitude of effect. This will result in a **Moderate Beneficial** effect upon the low sensitivity receptor. This is considered to be **significant**.

Townscape Character of the Site

- 10.64. At Completion, the Proposed Development will occupy the entire Site where it will represent an increase in scale of built form from the surface level car park, although the Proposed Development will step up in scale from the existing industrial development on Great Dulcie Street and River Irwell with the tallest elements set back towards the eastern edge of the Site. The taller elements of the Proposed Development contribute to the legibility of Proposed Development in the wider townscape where it will reflect the more vertical elements of built form on the south-west of the River Irwell, creating a transition between the organic townscape of the city centre and the unarticulated industrial built form north of the Site.
- 10.65. The Proposed Development will replace the declining condition of the Site with a well-considered built form that utilises design considerations founded in the local vernacular and townscape heritage such that it contributes positively to the townscape. Specifically, the use of brick elevations, precast cills, and deep reveals on the windows railings on balconettes are a nod to the past. The delivery of articulated facades with consistent exterior materiality that utilises the same bricks with different coloured mortar, pale pink and amber detailing around windows, and a strong frontage onto Great Dulcie Street created by piers and recessed windows, will enable the Proposed Development to contribute positively to the streetscape.
- 10.66. The Proposed Development will also deliver improved public realm with increased public accessibility by connecting the Site to Francis Street north of the Site, A6042 south of the Site and Great Dulcie Street west of the Site. The Proposed Development will improve connections through the public realm to the adjacent Brewery Gardens site. The landscape strategy for the Site will create a new public space and podium level roof garden that delivers green infrastructure on the Site. The Proposed Development is considered to give rise to a Large magnitude of effect to the Site that will result in a **Major Beneficial** effect upon the Low sensitivity receptor. This is considered to be **significant**.

Visual Effects

- 10.67. As set out in paragraph 10.62, the Visual Assessment is based upon Site Context Photographs 1 - 10 in Appendix 10.2, and verified views of the Proposed Development shown in Wirelines 1-10 in Appendix 10.3, which are representative of views experienced by the various visual receptors in the vicinity of the Site. The views where effects are considered likely to be significant are presented in this chapter with the full assessment of all 10 views presented in Appendix 10.5. Out of the 10 representative viewpoints agreed with MCC and assessed in Appendix 10.2, effects upon visual receptors at two locations are considered to be significant (either at construction phase, operational phase or both phases) effects on receptors at the other eight agreed viewpoints ranging from Negligible Adverse to Minor Adverse and non-significant. Discussion on these eight non-significant viewpoints is found within the Appendices.

- 10.68. The Proposed Development will alter the visibility of the Site due to the blocks of built form that will replace the existing surface level car park. The increased elevation of elements on the Site will, where visible, represent a homogenous townscape element that creates a strong frontage along Great Ducie Street where it will replace views of the existing car park and palisade fencing that are negative contributors to the visual amenity experience.

Viewpoint 4: View east from A4062 Ring Road

- 10.69. At Completion, the ground level aspects of the Proposed Development will be screened from view by built form on intervening land while the taller parts of the Proposed Development will be seen as part of the skyline in views along the highway boulevard of the A6042. The staggered massing of the introduced built form will contribute positively to the townscape, with brick elevations that rationalise the heritage of industrial buildings in the city. The precast cills and deep reveals on the windows will add articulation to the building facades while the Proposed Development will create a modulated transition from the lower rise area of Manchester north of the Site, towards the taller buildings within the city centre. The Proposed Development will represent a noticeable improvement in articulation and wayfinding in views east while framing the viewing corridor as one travels along the A6042. As such, the Proposed Development will cause a Medium magnitude of effect, resulting in a **Moderate Beneficial** significance of effect upon the Low sensitivity receptors. This is considered to be **significant**.

Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road

- 10.70. At Completion, the ground level and lower section of the Proposed Development will be partially screened from view by the existing Travelodge building on Great Ducie Street. However, the taller parts of the Proposed Development will be seen over the Travelodge building where they will appear against the skyline of the city centre. The brick elevations and arrangement of fenestration with deep reveals will contribute positively to the townscape where it will represent a rationalisation of the former industrial heritage in Manchester. The Proposed Development will be seen alongside existing and under construction modern tall buildings within the city centre where it will mark a transition from lower rise development north of the River Irwell, to the taller development within the centre of the urban area. The Proposed Development will be seen in views channelled along Great Ducie Street and will represent a noticeable improvement to views towards the city centre where existing tall buildings mark the centre of the city. As such, the Proposed Development will cause a Medium magnitude of effect, resulting in a **Moderate Beneficial** significance of effect upon the low sensitivity receptors. This is considered to be **significant**.

Summary of Impacts

- 10.71. The summary of the effects is shown in Table 10.1

Table 10.0.1: Summary of Impacts of the Proposed Development

Receptor	Receptor Sensitivity	Magnitude of Effect	Significance of Effect
Construction Phase			
Townscape Character Area 1: Strangeways	Low	Small	Minor Adverse – non-significant Temporary
Townscape Character of the Site	Low	Large	Major Adverse - significant Temporary
Viewpoint 4: View east from A4062 Ring Road	Low	Small	Minor Adverse – non-significant Temporary

Receptor	Receptor Sensitivity	Magnitude of Effect	Significance of Effect
Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road	Low	Medium	Moderate Adverse – significant Temporary
Operational Phase			
Townscape Character Area 1: Strangeways	Low	Medium	Moderate Beneficial – significant Permanent
Townscape Character of the Site	Low	Large	Major Beneficial – significant Permanent
Viewpoint 4: View east from A4062 Ring Road	Low	Medium	Moderate Beneficial – significant Permanent
Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road	Low	Medium	Moderate Beneficial – significant Permanent

Mitigation Measures

10.72. The Proposed Development includes a number of embedded mitigation measures from the outset. The design of the Proposed Development aims to embrace the urban location of the Site, reflecting and responding to the historic industrial character of Manchester to deliver built form that utilises:

- Massing that has been determined by the local existing and emerging context, site constraints, topography, consultation and pre-application feedback which has resulted in two buildings of 11 stories (Building A) and 27 stories (Building B) at their highest;
- Massing that defines and activates the Great Ducie Street frontage that is located on the northern edge of the city;
- Buildings that are orientated north-south to face parallel to Great Ducie Street, reflecting the hierarchy of the street and its importance as a gateway to accessing the City;
- A step in the built form that assists in breaking up the mass and elevation fronting Great Ducie Street;
- Simplified massing to aid the definition and scale of the ground floor;
- Strong piers that break up the ground floor elevation and are grounded on deep plinths that give a noticeable depth to the façade and sense of rhythm in the streetscape;
- Consistency in exterior materiality through use of the same brick for the entire façade, although provision of differentiation between the plinth and upper floors through the use of different colour mortars for the two sections;
- Setting the windows back by the width of a brick between piers;
- Detailing delivered by brick patterns and a pre-cast cill;
- Additional detailing provided by pale pink GRC and amber PPC aluminium;
- Horizontal banding to define bays on the façade that help to reduce the perceived scale of built form;
- Subservient horizontal banding to express the floors within the bay; and

- A recognisable differentiation between the more elegant expression on the upper floors and a more robust ground floor presence.

10.73. The design will also deliver public realm and green infrastructure benefits through introducing:

- A new public route through the Site that enhances pedestrian connectivity between Great Ducie Street and the proposed green space at the Old Brewery Gardens site, in line with the Boddingtons SRF;
- A landscaped courtyard, providing a sense of tranquillity and escapism from the hustle and bustle of a major urban centre, while delivering a safe and secure environment;
- A podium level roof terrace; and
- Maximised ground floor activation onto landscaped frontages.

10.74. The design strategy assumes that the Development is brought forward on the basis of the principles as set out above. Any planting proposals and their ongoing maintenance, management and future growth, is considered as further mitigation measures and form the basis of the assessment of residual townscape and visual effects of the Proposed Development during the Operational Phase.

Construction Phase

10.75. Secondary mitigation measures detailed within the outline Construction Environment Management Plan to further reduce the temporary effects of construction, as explained in Appendix 10.3, are proposed as follows:

- Controlling the lighting of construction compounds and machinery to minimise upward and outward light pollution through lantern design, direction and baffling, and ensuring that the minimum area only is lit, for the minimum period of time while satisfying other health and safety requirements;
- Restricting the movement of stockpiles to minimise vehicle tracking across the Site and perception of instability in the townscape; and
- Locating compounds and stockpiles in the least visible locations with the Site, including for rendering of facades to aid in integrating their form within views.

10.76. The above measures will be secured by a planning condition on the future permission, which will require further details to be submitted for approval by way of a detailed CEMP prior to construction of the Proposed Development in the usual way.

Operational Phase

10.77. Secondary mitigation measures to further minimise the potential for adverse effects during the operational phase, as explained in Appendix 10.3, are proposed as follows:

- The implementation and maintenance of the hard and soft landscape proposals throughout the lifetime of the Development, including advanced planting where practicable (and within the first available planting season).

Cumulative Effects

10.78. In the absence of the Proposed Development, the Site is likely to continue to be managed as a surface level car park or developed in line with aspirations set out within the Boddingtons SRF. The emerging context of the townscape in the area is heavily influenced by consented and planned development.

- 10.79. The townscape in the vicinity of the Site is anticipated to continue to evolve as emerging built form introduces new tall buildings, new architectural styles and new material palettes into this part of Manchester. The emerging development responds to aspirations for North Manchester SRF, Great Ducie Street SRF and Former Boddingtons Brewery Site SRF (and subsequent amendments) to increase housing provision through efficient utilisation of brownfield land. The under construction building for the new Manchester college building immediately adjacent to the southern Site boundary is five/six storeys, whilst the Manchester Arena directly opposite equates to a seven storey building. The Travelodge to the north of the Site is seven storeys high, whilst nearby approvals are substantially taller, including:
- Old Brewery Gardens, which includes a 32 storey, two 16 storey and two 13 storey residential blocks;
 - One Heritage Tower, which includes a 14 storey and 55 storey mixed use development;
 - Northern Gateway, which includes nine residential towers between 8 and 34 storeys;
- 10.80. For information, the following proposals which are under construction and which are also substantially taller include the following (and as wirelines within Appendix 10.3):
- Meadowside, which includes a 40 storey residential tower (considered in baseline, under construction);
 - Greengate, which includes a 50 storey residential tower and two 42 storey residential towers (considered in baseline, under construction);
 - New Victoria Road, which includes 21 and 26 storey residential towers and an 8 storey office block (considered in baseline, under construction); and
 - 4 Angel Square, which includes an 11 storey mixed use tower (considered in baseline, under construction).
- 10.81. The Cumulative Assessment is based upon verified views of the Proposed Development shown in Cumulative Wirelines 1-10 in Appendix 10.3 and discussed in depth in Appendix 10.5. The effects that are considered likely to be significant are presented in this chapter with the full cumulative assessment presented in Appendix 10.6.

Construction Phase

Townscape Effects

Townscape Character Area 1: Strangeways

- 10.82. Combined with the construction phase of Old Brewery Gardens within the TCA 1 and other cumulative schemes in the adjacent TCA's, the construction activities of the Proposed Development will occur within an urban setting where construction activities are typical features and will not alter the urban setting of TCA 1. This will cause a Small cumulative magnitude of effect and result in a Minor Adverse cumulative significance of effect. This is not considered to be significant.

Townscape Character of the Site

- 10.83. The temporary construction phase of the Proposed Development will occupy land that is currently occupied by surface level car parking. Any perceived effects on the Site from construction operations for cumulative schemes in the wider townscape such as the adjacent Old Brewery Gardens, will consolidate the sense of disturbance on the Site. Ground level and elevated movement and noise will combine with construction activities in the wider urban area, which will

cause a Large cumulative magnitude of effect and result in a Major Adverse cumulative effect upon the character and setting of the Site. This is considered to be significant.

Visual Effects

Viewpoint 4: View east from A6042 Ring Road

- 10.84. The temporary construction phase of the Proposed Development will be seen in the same section of views as construction activities for the cumulative scheme of Old Brewery Gardens, Angel Meadows, New Victoria Road and Mirabel Street. Construction activities for the Proposed Development will combine with construction activities for the cumulative schemes to occupy a wide section of the view but will appear alongside and partially screen construction activities at the Old Brewery Gardens. The addition of the construction activities for the Proposed Development will cause a Medium cumulative magnitude of effect as they will exacerbate the tall construction works in views and extend the amount of view occupied. This will result in a **Moderate Adverse** cumulative significance of effect. This is considered to be **significant but temporary in nature**.

Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road

- 10.85. The temporary construction phase of the Proposed Development will be partially visible the same section of views as construction activities for the cumulative scheme of Angel Meadows and Old Brewery Gardens for visual receptors with views south-east along Great Ducie Street. Construction activities for the Proposed Development will occupy a wide section of the skyline in close range views. The addition of the construction activities for the Proposed Development will cause a Large cumulative magnitude of effect as the majority of the background of the view will be occupied by large scale construction plant and machinery for an extended period, diminishing the visual amenity experience. This will result in a **Moderate Adverse** cumulative significance of effect. This is considered to be **significant but temporary in nature**.

Operational Phase

Townscape Effects

Townscape Character Area 1: Strangeways

- 10.86. The Proposed Development will be located within TCA 1 alongside the Old Brewery Gardens, with other cumulative schemes in adjacent TCA's, where they will all be located within the urban context of the developed city area with built form typical. When considered alongside the cumulative schemes, the Proposed Development will be located within an area of existing urban character where the improved building quality, urban realm and landscape provision will cause a Large cumulative magnitude of effect. As such, the Proposed Development will result in a **Major Beneficial** cumulative significance of effect. This is considered to be **significant**.

Townscape Character of the Site

- 10.87. At Completion, the Proposed Development will provide Site-wide improvements to the quality of built form through the delivery of a homogeneous townscape element. The block arrangement of the Proposed Development will allow a much clearer legibility of the Site with any perceived effects on the Site from built form on the sites of cumulative schemes in the wider townscape providing a consolidation the existing urban context of the surrounding townscape. Landscape proposals and exterior treatments of the Proposed Development will combine with the adjacent Old Brewery Gardens development to deliver connected green infrastructure and coherent materiality that reflects the industrial heritage of the city and will cause a Large cumulative

magnitude of effect. As such, the Proposed Development will result in a **Major Beneficial** cumulative effect. This is considered to be **significant**.

Visual Effects

Viewpoint 4: View east from A4062 Ring Road

- 10.88. At Completion, the Proposed Development will be partially visible in the foreground of the cumulative scheme of the Old Brewery Gardens and will be seen alongside the taller parts of cumulative schemes Angel Meadows, New Victoria Road and Mirabel Street. The Proposed Development will combine with the blocks of the Old Brewery Gardens scheme to deliver a coherent materiality that reflects the industrial heritage of the city, with the exterior treatments providing a strong articulation of building facades complement each other and create a defined skyline element that also complements the taller development in the city centre, south of the A4062. The combination of the Proposed Development and the Old Brewery Gardens cumulative scheme will aid with wayfinding and mark the modulated transition from the low rise built form north of the Site to the taller built form within the city centre to the south. As such, the Proposed Development will cause a Medium cumulative magnitude of effect, resulting in a **Moderate Beneficial** cumulative significance of effect. This is considered to be **significant**.

Viewpoint 7: View south-east from A56 Great Ducie Street/ Bury New Road

- 10.89. At Completion, the Proposed Development will be partially visible alongside the cumulative scheme of the Old Brewery Gardens where it will represent a consolidation of built form on the edge of the city centre aiding in providing a sense of arrival to the city centre for receptors facing towards the city centre. The Proposed Development will combine with the blocks of the Old Brewery Gardens scheme to deliver a coherent materiality that reflects the industrial heritage of the city, providing a strong articulation of building facades. The blocks of the Proposed Development and cumulative scheme of Old Brewery Gardens will complement each other and create a defined skyline element, with the stepped arrangement of the Proposed Development and adjacent Old Brewery Gardens leading the eye towards the tallest element of the latter. The composition of the view will be fundamentally altered. As such, the Proposed Development will cause a Large cumulative magnitude of effect, resulting in a **Moderate Beneficial** significance of effect. This is considered to be **significant**.

Residual Effects

- 10.90. The residual effects remain as identified for the temporary construction phase and completion of the Proposed Development following the implementation of mitigation measures which are summarised in Table 10.2.

Table 10.2 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Minor Adverse	Townscape Character Area 1: Strangeways	Controlling the lighting of construction compounds and machinery to minimise upward and outward light pollution	Adoption of CEMP	Minor Adverse – non-significant Temporary
Major Adverse	Townscape Character of the Site	through lantern design, direction and baffling, and ensuring that the minimum area only is lit, for the minimum period of time while		Major Adverse - significant Temporary

Minor Adverse	Viewpoint 4	satisfying other health and safety requirements;		Minor Adverse – non-significant Temporary
Moderate Adverse	Viewpoint 7	Restricting the movement of stockpiles to minimise vehicle tracking across the Site and perception of instability in the townscape; and Locating compounds and stockpiles in the least visible locations with the Site, including for rendering of facades to aid in integrating their form within views.		Moderate Adverse – significant Temporary
Operational Phase				
Moderate Beneficial	Townscape Character Area 1: Strangeways	The embedded mitigation measures of implementation and maintenance of the hard and soft landscape proposals throughout the lifetime of the Development, including advanced planting where practicable (and within first available planting season).	Adoption of an appropriate landscape management strategy	Moderate Beneficial – significant Permanent
Major Beneficial	Townscape Character of the Site			Major Beneficial – significant Permanent
Moderate Beneficial	Viewpoint 4			Moderate Beneficial – significant Permanent
Moderate Beneficial	Viewpoint 7			Moderate Beneficial – significant Permanent

Reference List

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

- National Planning Policy Framework 2021;
- Planning Practice Guidance 2021;
- National Design Guide 2021
- Manchester Local Development Framework Core Strategy 2012;
- North Manchester Strategic Regeneration Framework 2012;
- Great Ducie Street Strategic Regeneration Framework 2018;
- Boddingtons Strategic Regeneration Framework 2015;
- Boddingtons Strategic Regeneration Framework addendum 2019;
- National Character Area 55: Manchester Conurbation;
- Manchester Strategic Level City Wide Urban Characterisation 2010;
- Guidelines for Landscape and Visual Impact Assessment 2013.

Wind Microclimate

Introduction

- 11.1. This Chapter of the ES has been prepared by GIA and assesses the likely significant effects in relation to Wind Microclimate as a result of the proposed development on the site and surrounding area. This Chapter also describes the methodology used to assess these likely significant effects, sets out the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual impacts after these mitigation measures have been adopted.
- 11.2. This Chapter is accompanied by 1 technical appendix, Wind Microclimate Detailed Methodology (appendix 11.1).
- 11.3. This chapter was written by Dr Jon Winchester. Jon holds a BSc in Mathematics, MSc in Mechanical Engineering and PhD in Mechanical Engineering. Jon has 9 years of experience of wind analysis for the built environment, developing methods for pedestrian comfort analysis, wind loading and natural ventilation. Jon is the Wind Technical Director of GIA.

Legislative and Policy Context

- 11.4. The assessment was performed using the London Docklands Development Corporation (LDDC) variant of the Lawson Comfort Criteria. The Lawson Criteria are well-established in the UK for quantifying wind conditions in relation to build developments and, although not a UK 'standard', the criteria are recognised by local authorities as a suitable benchmark for wind assessments. The LDDC variant is established as the most practically applicable variant of the Lawson criteria, and is used industry wide. The Lawson Criteria (LDDC variant) have been adopted for this assessment.
- 11.5. The assessment will have due regard to the provisions of the following policy and guidance.

National Planning Policy and Guidance

National Planning Policy Framework 2021

- 11.6. The National Planning Policy Framework (NPPF) was revised in July 2021 by the Department of Communities and Local Government (DCLG). The relevant paragraphs are as follows:

Paragraph 130 of the National Planning Policy Framework states that:

"Planning policies and decisions should ensure that developments:

... 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."

There is no specific planning policy guidance dealing with microclimate in terms of pedestrian comfort set out in the revised NPPF.

The National Planning Practice Guidance (NPPG) 2021

- 11.7. The NPPG identifies the potential for tall and large buildings to affect the wind microclimate. The National Design Guide (2021) states in Paragraph 71 that: "Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily"

Local Planning Policy

Manchester Core Strategy (2012 – 2027)

- 11.8. Policy EN2 – Tall Buildings – States that, by their very size, tall buildings can have a significant impact on the local environment and its micro-climate. It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment.

Guide to Development in Manchester (Adopted April 2007)

- 11.9. The Guide to Development in Manchester states that, when considering development quality; “Key questions will be the quality and interest of the roofline; the design of the lower floors; the relationship to the surrounding streets; the impact of servicing and parking requirements; the microclimate, including overshadowing and air turbulence effects, created by the relationship of the building to those adjacent; and the quality and usability of the spaces surrounding the building.”

Assessment Methodology and Significance Criteria

- 11.10. The assessment was performed using GIA’s high-resolution Computational Fluid Dynamics (CFD) modelling. This methodology is chosen as there is significant precedent that CFD is a suitable tool for schemes of this scale in Manchester.
- 11.11. CFD is a digital modelling technique, which simulates the effect of wind for the built environment. The air is divided into hundreds of millions of “cells”, within which the equations of motion are solved. GIA uses cloud computing from Amazon Web Services (AWS) to run the simulations, to ensure vast scalability and appropriate resource availability for any project.
- 11.12. A full description of the test methodology is included in appendix 11.1.

Methodology for Establishing Construction Effects

- 11.13. During the construction of the Proposed Development, once the building height is above the average height of the surrounding buildings, there is potential for wind effects around the base of the buildings. This potential will become greater as the Proposed Development reaches its full height.
- 11.14. The extent and severity of these effects were derived from comparison of baseline conditions and operational effects.

Methodology for Establishing Operational Effects

- 11.15. Operational effects were established using a high resolution CFD model, extending 400m radius from the Site (in line with current industry best practice).
- 11.16. The model was run at full scale from 18 wind angles, spaced using 10° or 30° increments such that no sector contributes more than 10% of the annual wind. The wind angles which were run are indicated in Appendix 11.1.
- 11.17. Wind speeds were measured at 1.5m above any surfaces expected to be used for pedestrian activity.
- 11.18. On-site and local wind speeds were combined with 30 years-worth of weather data for Manchester International Airport, corrected for terrain local to the airport and the Site, to obtain annual and seasonal frequency and magnitude of wind speeds across the model. This allows the ‘grading’ of the pedestrian level winds according to the Lawson Comfort Criteria, which are explained later in this chapter.

- 11.19. Seasonal wind roses for the airport are shown in Figure 11.1. The dominant wind direction is from the south.
- 11.20. The correction factors between the airport (measured 10m above ground) and the Site (at a reference height of 120m) are shown in Table 11.1. It should be noted that the terrain analysis has been performed using sectors of 30°, which is presented here.

Table 11.1 – Site Wind Correction Factors

0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	300°
1.47	1.45	1.45	1.42	1.34	1.30	1.30	1.30	1.32	1.30	1.43	1.41

Target Conditions

- 11.21. The Lawson Criteria is recognised guidance used universally across the UK to assess the impact of the proposed development on wind flows in public spaces. Lawson devised a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence. This guidance will be used to inform the assessment. The commonly used London Docklands Development Corporation (LDDC) method of the Lawson Criteria is set out in Table 11.2 and 11.3 below.

Table 11.2: Lawson Comfort Criteria (LDDC variant)

Comfort Category	Mean Wind Speed (5% exceedance)	Description
Sitting	4m/s	Acceptable for outdoor sitting use (e.g. cafes, benches, balconies)
Standing	6m/s	Acceptable for main building entrances, pick-up / drop-off points and bus stops
Walking (leisure)	8m/s	Acceptable for strolling
Walking (business)	10m/s	Acceptable for external pavements, walking purposefully without lingering
Uncomfortable	>10m/s	Not comfortable for regular pedestrian access

Table 11.3: Lawson Safety Criteria (LDDC variant)

Safety Category	Mean Wind Speed (0.0022% exceedance)	Description
No Safety Exceedance	<15m/s	
S15 (distress)	>15m/s	Unsafe for frail individuals, or cyclists
S20 (safety)	>20m/s	Wind conditions considered unsafe for all users

- 11.22. For a mixed-use urban area within which the Proposed Development Site is located, the desired wind microclimate would typically need to have areas acceptable for sitting, standing (including at entrances of buildings) and walking use.
- 11.23. During operation, exceedance of either S15 or S20 will be classified as unsafe.
- 11.24. During construction or decommission, it can reasonably be assumed that the Proposed Development Site will be occupied by busy construction workers, who are unlikely to be frail individuals. As such, only S20 exceedances are classified as unsafe for on-site effects during these phases. Note that this does not apply to any existing public realm within the site which is not due to be closed off throughout construction.
- 11.25. Any areas which show up as either unsafe (annually) or uncomfortable (for winter) are considered unsuitable, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the Proposed Development.
- 11.26. There are proposed amenity spaces within the Development (in the form of both the courtyard and the podium level terrace), which are targeted to be suitable for a mixture of sitting and standing during the summer months. This will allow user to choose to sit in “calmer” areas and engage in more active pursuits in “windier” areas.
- 11.27. There are the Trinity Way bus stops along Great Ducie Street, which are targeted to be suitable for standing.
- 11.28. The areas immediately outside any building entrances should be suitable for standing use during winter to provide a “buffer” between the still conditions in interior spaces and the general thoroughfare. This applies both to the entrances of the Proposed Development and also off-site entrances.

Test Scenarios

- 11.29. The following scenarios were assessed and considered:
- Scenario 1: Baseline (2022);
 - Scenario 2: Future Baseline (2026) including Cumulative Schemes;
 - Scenario 3: The Completed and Operational Development in baseline surrounds;
 - Scenario 4: The Completed and Operational Development in cumulative surrounds.
- 11.30. The Proposed Development is shown in Figure 11.2.
- 11.31. The Proposed Development was tested including tree planting within the courtyard at ground level, in accordance with the landscaping scheme “2159_ExA_XREF_GF.dwg”, provided by Exterior Architecture.
- 11.32. The following committed developments are under construction and were included in the baseline:
- Land on the Corner of Great Ducie Street and New Bridge Street (124995/FO/2019)
 - Land on the Corner of Greengate and New Bridge Street (19/30798/IN)
 - Land at Norton Court, Greengate (15/66806/FUL)
- 11.33. The following committed developments were not included in the baseline, but were included in the cumulative surrounds:
- Former Boddingtons Brewery Site (118831/FO/2018)

Embedded Mitigation

11.34. The following measures were included as embedded mitigation measures, and are shown in Figure 10.3:

- A 2m deep solid canopy, extending across the courtyard side of the eastern entrance passageway, covering the portal plus the first bay on this side.
- A 50% porous top to the proposed pergola within the courtyard.

Significance Criteria

Magnitude of Effect

11.35. The magnitude of effects are determined according to how much they vary from the target conditions as defined in the table below.

Table 11.4: Wind Microclimate Magnitude of Effect

Magnitude of Effect	Criteria
Major	Wind conditions which are three categories windier/calmer than the target conditions
Moderate	Wind conditions which are two categories windier/calmer than the target conditions
Minor	Wind conditions which are one categories windier/calmer than the target conditions
Negligible	Conditions are those required for their intended use

Sensitivity of Identified Receptor

11.36. The sensitivity of receptors is as defined in the table below.

Table 11.5: Wind Microclimate Sensitivity of Receptor

Sensitivity	Definition
High	Any amenity spaces, public realm, footpaths or entrances to buildings
Moderate	Any general thoroughfares through or around the Proposed Development Site.
Low	Locations which are not accessible to pedestrians

Significance of Effects

11.37. The significance of any identified environmental effects will be determined by the assessment of their magnitude against their sensitivity. The table below illustrates how the sensitivity of the receptors and the magnitude of any effect combine to confirm significance.

- 11.38. Additionally, any risk to pedestrian safety (S15 or S20 exceedances) which is introduced by the proposed development is a major adverse effect.

Table 11.6: Effect 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

Limitations and Assumptions

- 11.39. The accuracy of the results is dependent upon the accuracy of the architectural CAD used to construct the model.
- 11.40. There is an inherent assumption that on-site wind speeds will scale linearly with the measured wind speeds at the airport (Manchester International)., and therefore all worst-case wind speeds will be captured.
- 11.41. It is assumed that, during the construction process, wind conditions will gradually change from the Baseline Conditions to the conditions for the Completed Proposed Development.
- 11.42. It is assumed that on-site activity during construction will be able to withstand a higher category of pedestrian comfort level than for the Completed Proposed Development.
- 11.43. It is assumed that site hoarding does not have a significant impact on wind conditions during construction.
- 11.44. It is assumed that the Proposed Development is not open to the public until after the completion of both buildings.

Baseline Conditions

Conditions for Current Baseline (2022)

- 11.45. Conditions for the baseline scenario (Scenario 1) are shown in Figure 11.4, Figure 11.5 and Figure 11.6.
- 11.46. Winter conditions are suitable for a mixture of sitting, standing and leisure walking. Summer conditions are suitable for a mixture of sitting and standing.
- 11.47. There are no safety exceedances.
- 11.48. Conditions on local thoroughfares are suitable for leisure walking at worst, which is suitable for the intended use.

- 11.49. Conditions at the north-bound ring road bus stop are suitable for sitting in either winter or summer, this is suitable for the intended use.
- 11.50. Conditions at the south-bound ring road bus stop are suitable for leisure walking in winter and for standing in summer, this is a category windier than required for the intended use.
- 11.51. All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use.

Conditions for Future Baseline (2026)

- 11.52. Conditions for the future baseline scenario (Scenario 2) are shown in Figure 11.7, Figure 11.8 and Figure 11.9. This is for when the Proposed Development is not progressed, but Old Brewery Gardens is completed. Therefore this scenario is not within the control of the Applicant but included for context.
- 11.53. Winter conditions are suitable for a mixture of sitting, standing, leisure walking and business walking.
- 11.54. Summer conditions are suitable for a mixture of sitting and standing and leisure walking.
- 11.55. There is a substantial region of S15 (distress) to the east of the site within the development at the Former Boddingtons Brewery Site (118831/FO/2018). This is an exceedance of up to 20 hours per year over the 15m/s threshold and poses a risk to pedestrian safety in this region.
- 11.56. Conditions at the north-bound Ring Road bus stop are suitable for sitting in either winter or summer, this is suitable for the intended use.
- 11.57. Conditions at the south-bound Ring Road bus stop are suitable for standing in either winter or summer, this is suitable for the intended use.
- 11.58. All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use.

Identification and Evaluation of Significant Effects

Construction Effects

- 11.59. During construction, conditions will gradually transition to those of the completed Proposed Development. As operational conditions are expected to be suitable for the intended use, so will those conditions which are experienced during construction. Therefore, all Phase 1 construction wind effects will be negligible (not significant).

Operational Effects

- 11.60. Conditions at ground level for the scenario with the proposed development in the baseline surrounds (Scenario 3) are shown in Figure 11.10, Figure 11.11 and Figure 11.12.
- 11.61. Winter conditions are suitable for a mixture of sitting, standing and leisure walking. Summer conditions are suitable for a mixture of sitting and standing.
- 11.62. There are no safety exceedances at ground level, which is a negligible wind effect (not significant).
- 11.63. Conditions on local thoroughfares are suitable for business walking at worst, which is suitable for the intended use and is a negligible wind effect (not significant).
- 11.64. Conditions at the north-bound Ring Road bus stop are suitable for sitting in either winter or summer, this is suitable for the intended use and is a negligible wind effect (not significant).
- 11.65. Conditions at the south-bound Ring Road bus stop are suitable for standing in winter and for sitting in summer, this is a category calmer than the baseline, and becomes suitable for the intended use. This is a moderate-minor beneficial wind effect (significant)

- 11.66. All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use and is a negligible wind effect (not significant).
- 11.67. All on-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use and is a negligible wind effect (not significant).
- 11.68. Conditions in the courtyard in the centre of the Proposed Development are suitable for a mixture of sitting, standing and leisure walking in winter and for a mixture of sitting and standing in summer. This is suitable for the intended use and is a negligible wind effect (not significant).
- 11.69. Conditions at terrace level for the scenario with the proposed development in the baseline surrounds (Scenario 3) are shown in Figure 11.13, Figure 11.14 and Figure 11.15.
- 11.70. There are no safety exceedances in the podium level terrace, which is a negligible wind effect (not significant).
- 11.71. Conditions on roof terrace are suitable for a mixture of sitting, standing, leisure walking and business walking in winter, and are suitable for a mixture of sitting and standing in summer. There are some highly localised regions which are suitable for leisure walking in summer, but these are not of sufficient extent to affect the operation of the terrace. This is suitable for the intended use and is a negligible wind effect (not significant).

Mitigation Measures

- 11.72. No further mitigation measures will be required to achieve suitable conditions.

Cumulative Effects

- 11.73. A cumulative scenario was tested, including the following committed development:
- Former Boddingtons Brewery Site (118831/FO/2018)
- 11.74. Conditions at ground level for the scenario with the proposed development in the cumulative surrounds (Scenario 3) are shown in Figure 11.16, Figure 11.17 and Figure 11.18.
- 11.75. Winter conditions are suitable for a mixture of sitting, standing, leisure walking and business walking.
- 11.76. Summer conditions are suitable for a mixture of sitting and standing and leisure walking.
- 11.77. There is a substantial region of S15 (distress) to the east of the site within the development at the Former Boddingtons Brewery Site (118831/FO/2018). This is an exceedance of up to 4 hours per year over the 15m/s threshold and poses a risk to pedestrian safety in this region. This is, however, significantly reduced in strength from the region of S15 exceedance at this location for the future baseline (Scenario 2), which was 20 hours per year over the 15m/s threshold. Therefore, the Proposed Development will substantially reduce the risk to pedestrian safety in this region, which is a major beneficial wind effect (significant).
- 11.78. Conditions on local thoroughfares are suitable for business walking at worst, which is suitable for the intended use and is a negligible wind effect (not significant).
- 11.79. Conditions at the north-bound Trinity Way bus stop are suitable for sitting in either winter or summer, this is suitable for the intended use and is a negligible wind effect (not significant).
- 11.80. Conditions at the south-bound Trinity Way bus stop are suitable for standing in winter and for sitting in summer, this is suitable for the intended use and is a negligible wind effect (not significant).
- 11.81. All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use and is a negligible wind effect (not significant).

- 11.82. All on-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use and is a negligible wind effect (not significant).
- 11.83. Conditions in the courtyard in the centre of the Proposed Development are suitable for a mixture of sitting, standing and leisure walking in winter and for a mixture of sitting and standing in summer. This is suitable for the intended use and is a negligible wind effect (not significant).
- 11.84. Conditions at terrace level for the scenario with the proposed development in the cumulative surrounds (Scenario 4) are shown in Figure 11.19, Figure 11.20 and Figure 11.21.
- 11.85. There are no safety exceedances in the podium level terrace, which is a negligible wind effect (not significant).
- 11.86. Conditions on the podium level terrace are suitable for a mixture of sitting, standing, leisure walking and business walking in winter, and are suitable for a mixture of sitting and standing in summer. There are some highly localised regions which are suitable for leisure walking in summer, but these are not of sufficient extent to affect the operation of the terrace. This is suitable for the intended use and is a negligible wind effect (not significant).

Residual Effects

- 11.87. Table 11.7 Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Negligible effects on wind microclimate	General Thoroughfares	None		Negligible effects on wind microclimate
Negligible effects on wind microclimate	Bus Stops	None		Negligible effects on wind microclimate
Negligible effects on wind microclimate	Building Entrances	None		Negligible effects on wind microclimate
Operational Phase				
Negligible effects on wind microclimate	General Thoroughfares	Embedded into the design		Negligible effects on wind microclimate
Moderate-minor beneficial effects on wind microclimate	Bus Stops	None		Moderate-minor beneficial effects on wind microclimate
Negligible effects on wind microclimate	Building Entrances	Embedded into the design		Negligible effects on wind microclimate
Negligible effects on wind microclimate	Courtyard Amenity	Embedded into the design		Negligible effects on wind microclimate
Negligible effects on wind microclimate	Podium Terrace Amenity	Embedded into the design		Negligible effects on wind microclimate

Reference List

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

- Guide to Development in Manchester (2007), see:
https://secure.manchester.gov.uk/site/scripts/download_info.php?downloadID=644&fileID=1424
- Manchester City Council (2012). Manchester Core Strategy (2012 – 2027). See:
http://www.manchester.gov.uk/downloads/download/4964/core_strategy_development_plan
- National Planning Policy Framework (2021). See:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf
- National Design Guide (2021). See:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962113/National_design_guide.pdf

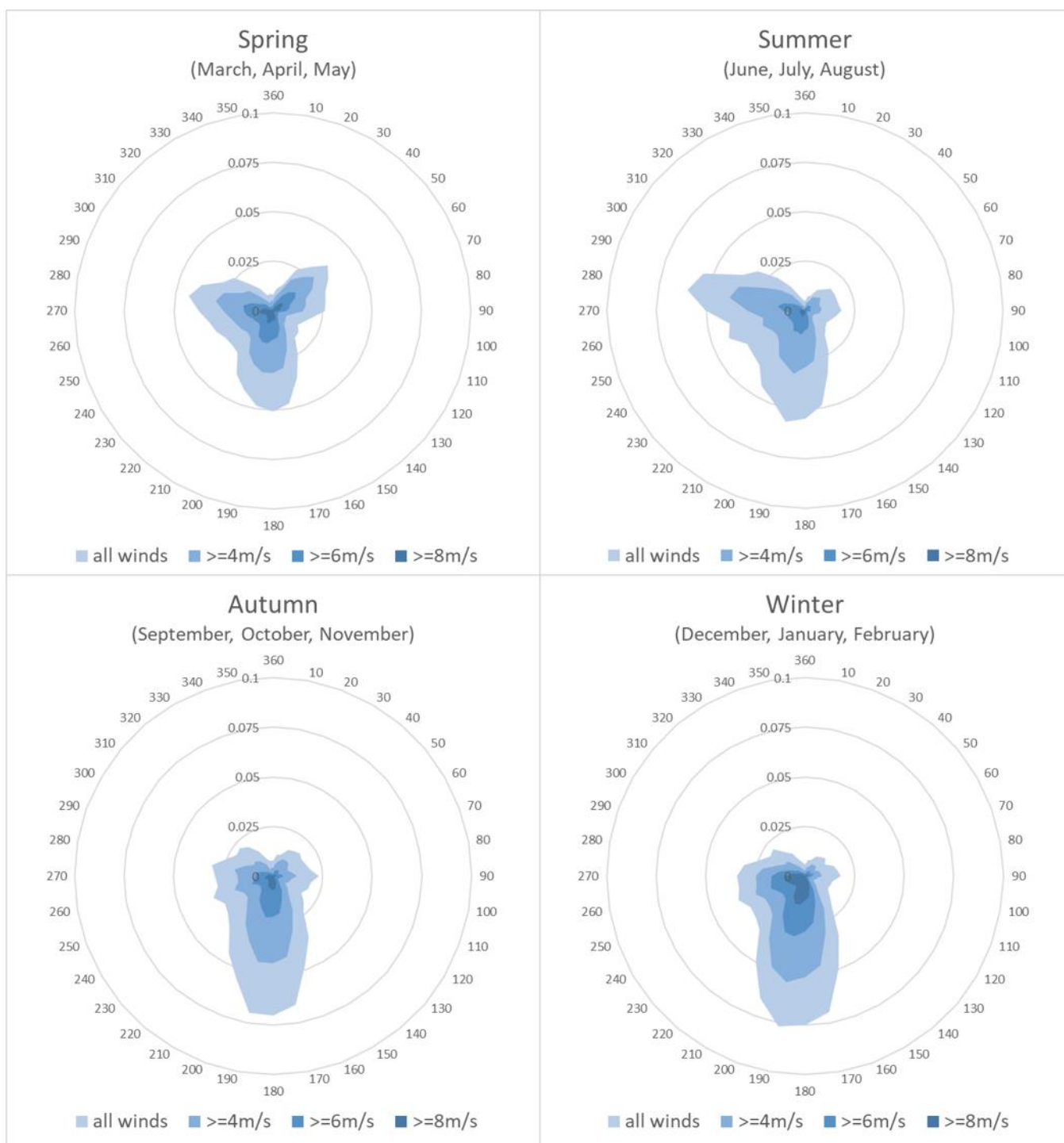


	Figure:	11.1		
	Title:	Seasonal Wind Roses (Manchester Airport)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

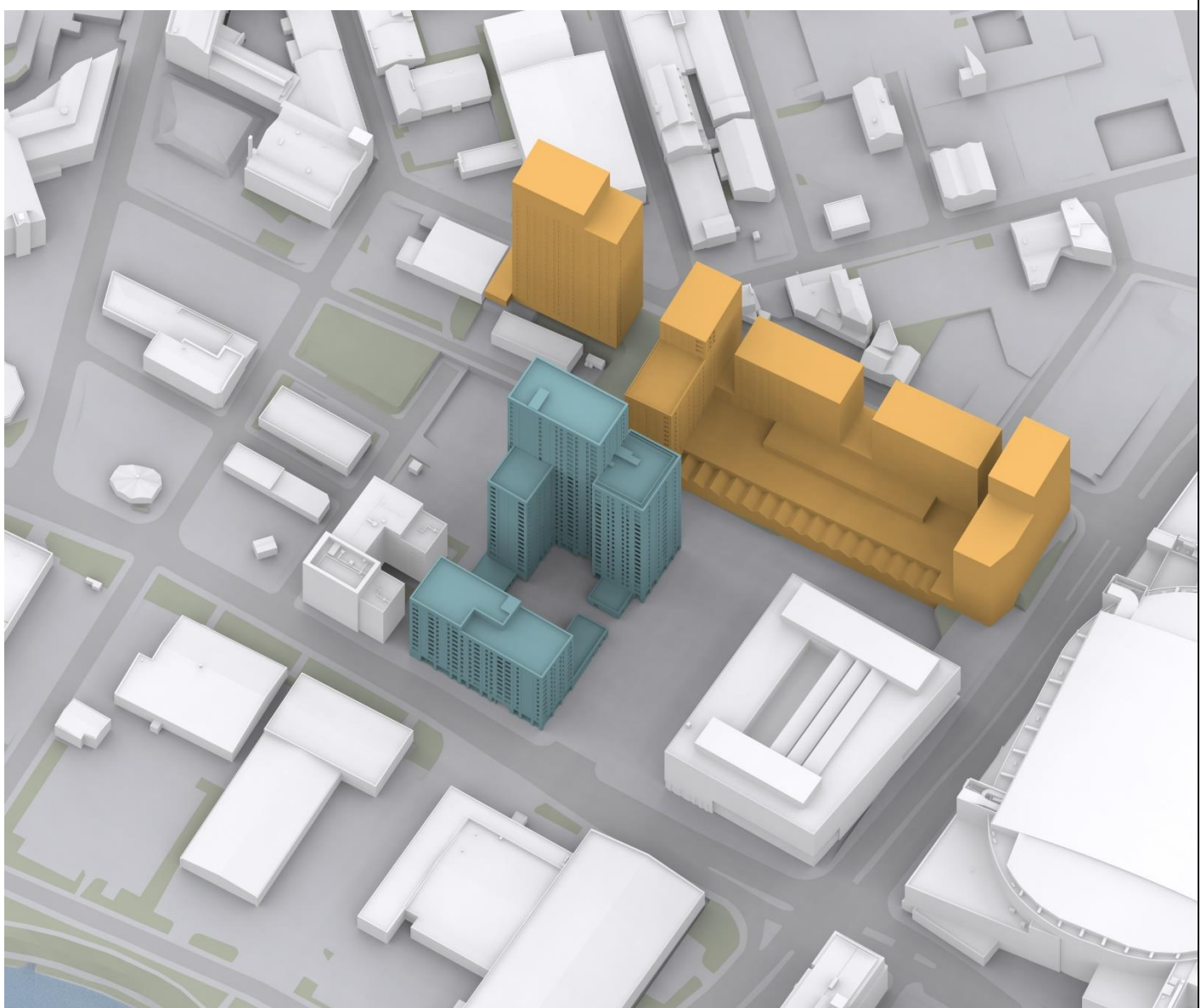


	Figure:	11.2		
	Title:	3D view of Proposed Development		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

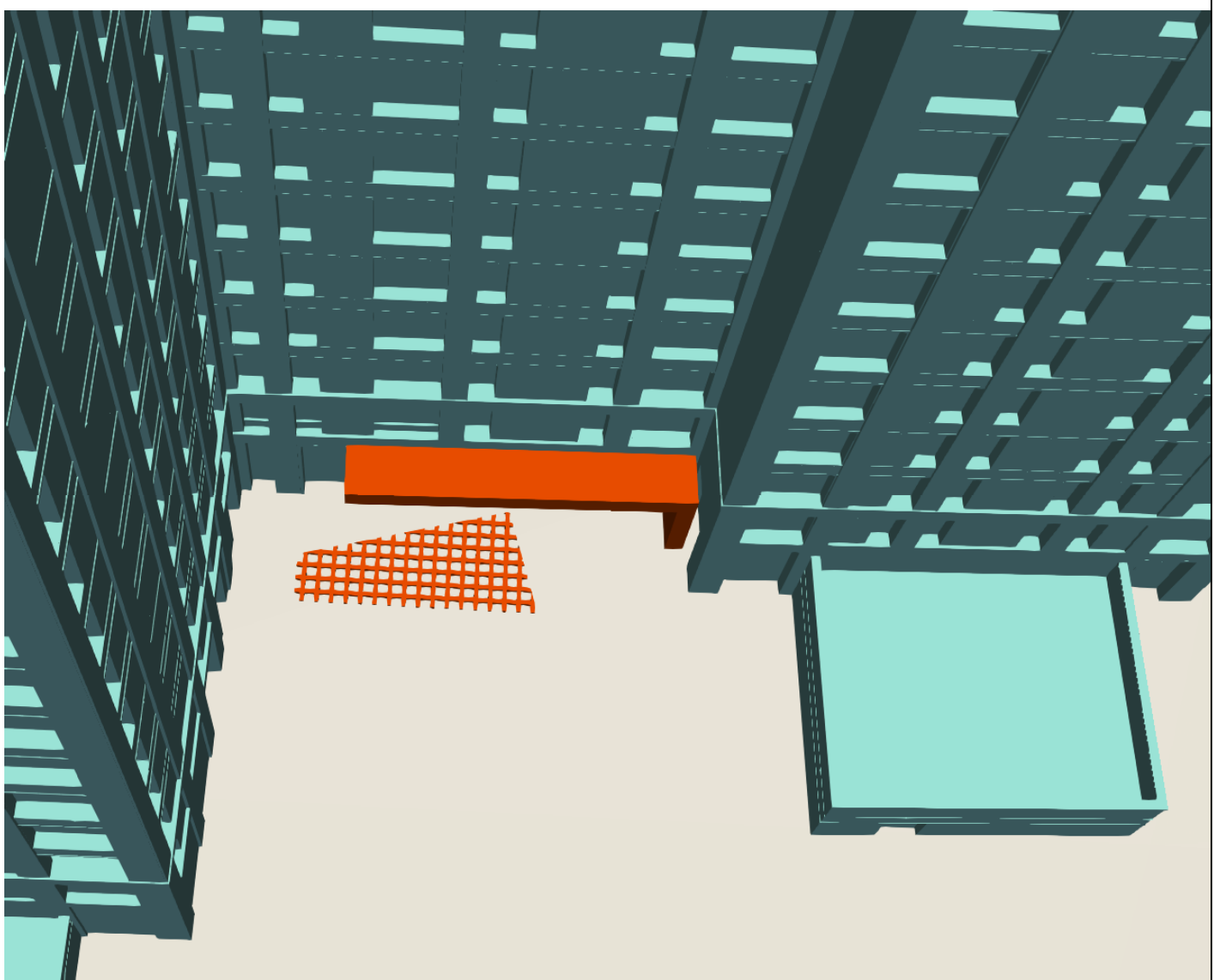
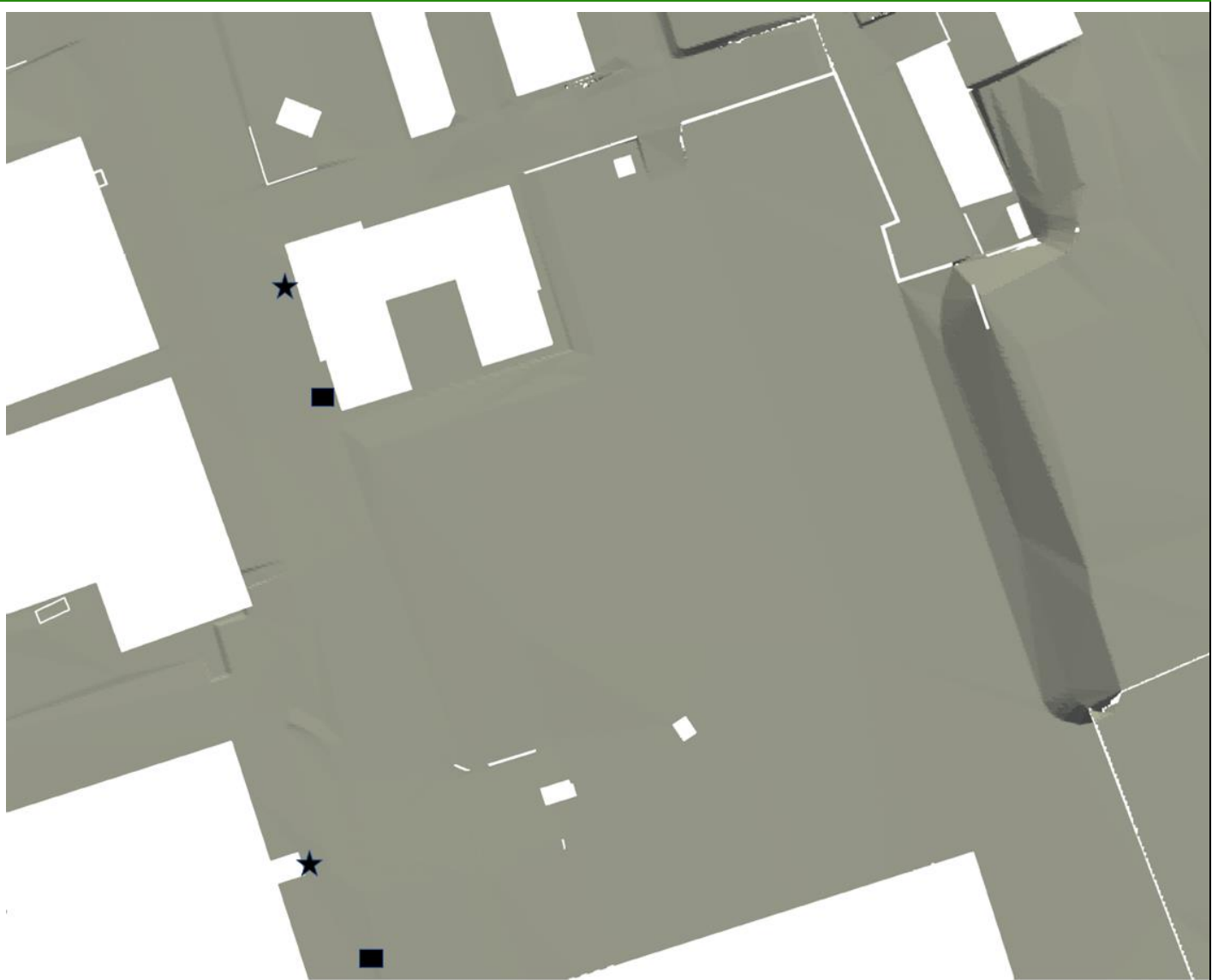
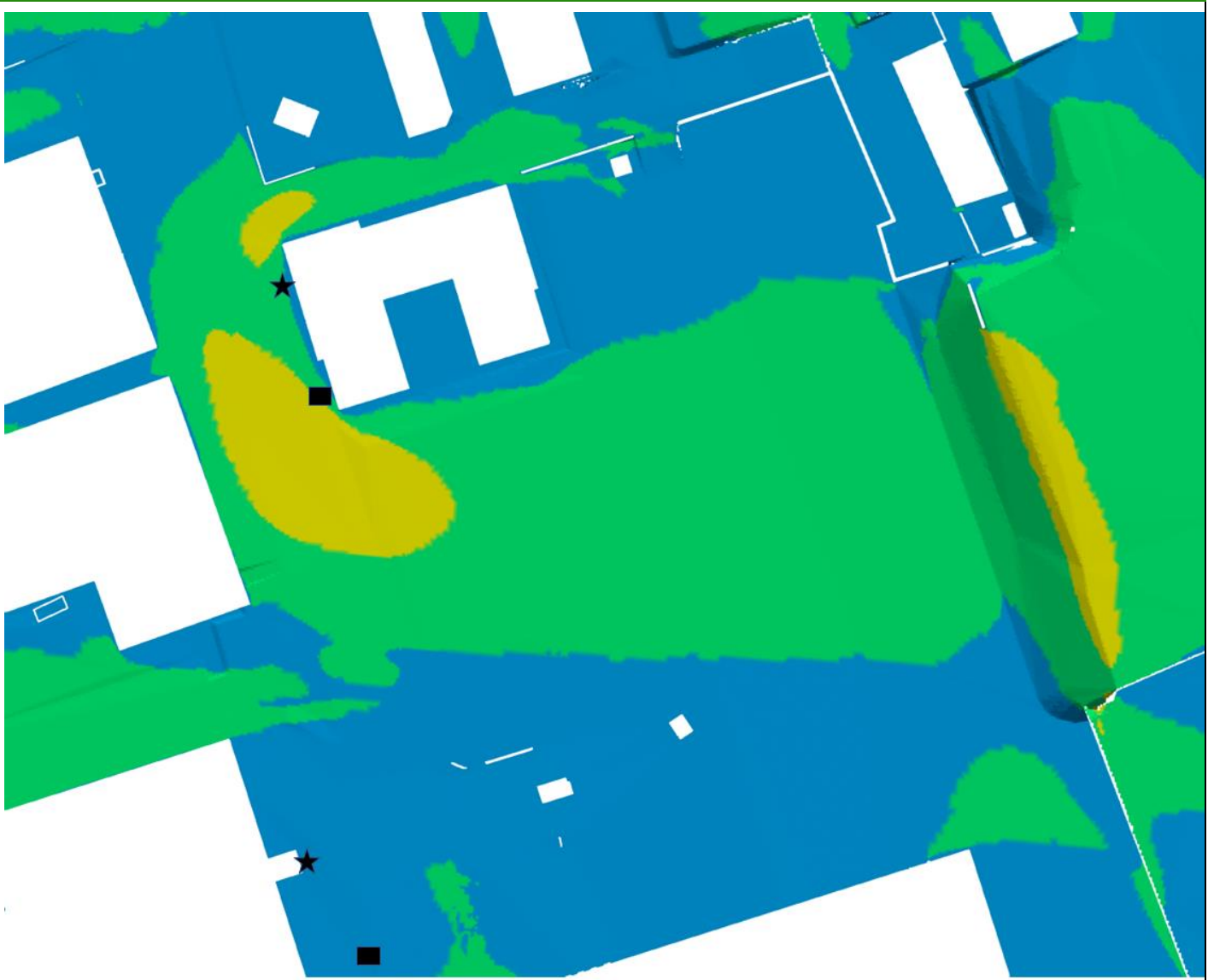


	Figure:	11.3		
	Title:	Canopies (as tested)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



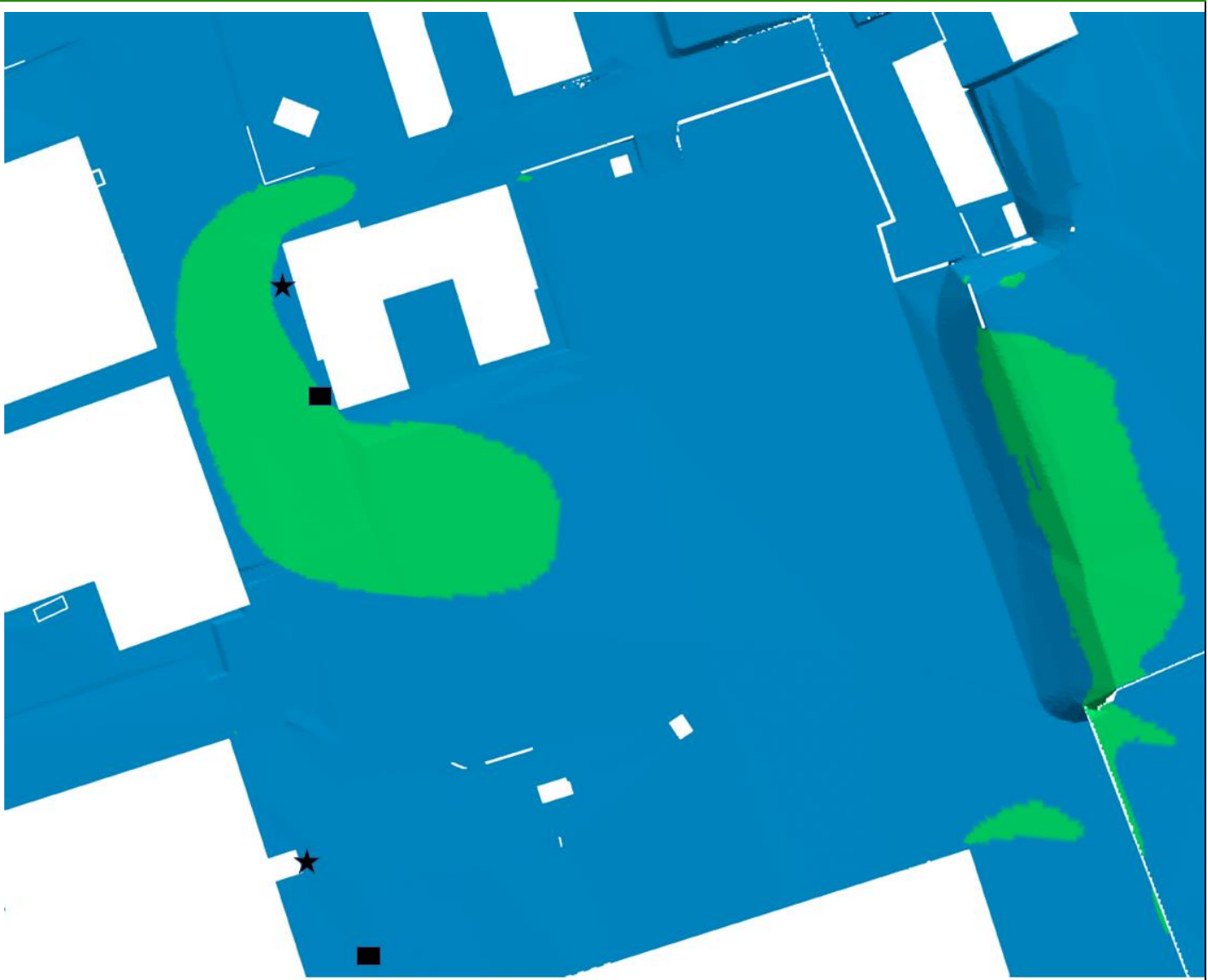
- Bus Stops
- ★ Key Off-Site Entrances

	Figure:	11.4		
	Title:	Scenario 1: Ground Level Wind Safety (Annual)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



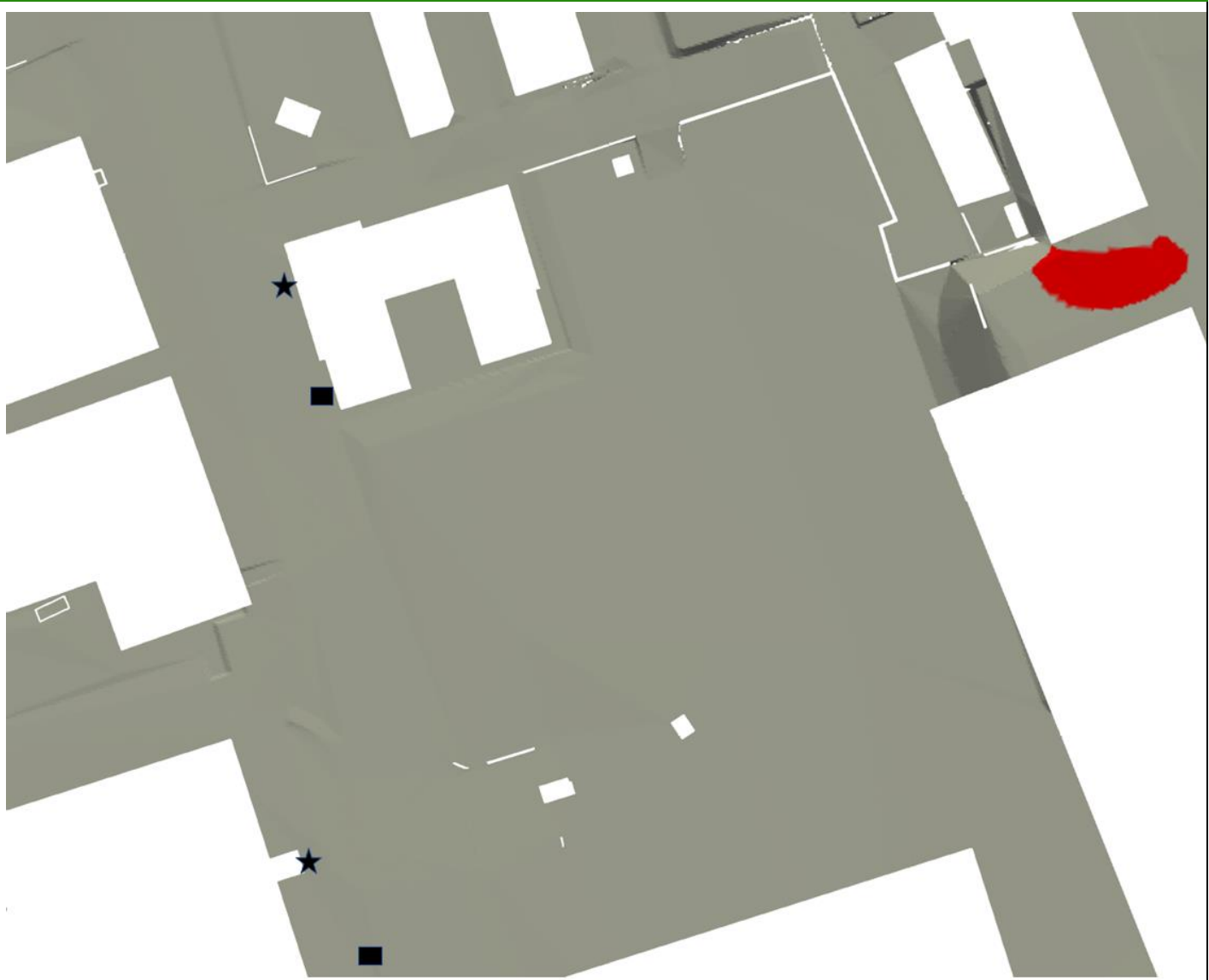
- Bus Stops
- ★ Key Off-Site Entrances

	Figure:	11.5		
	Title:	Scenario 1: Ground Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



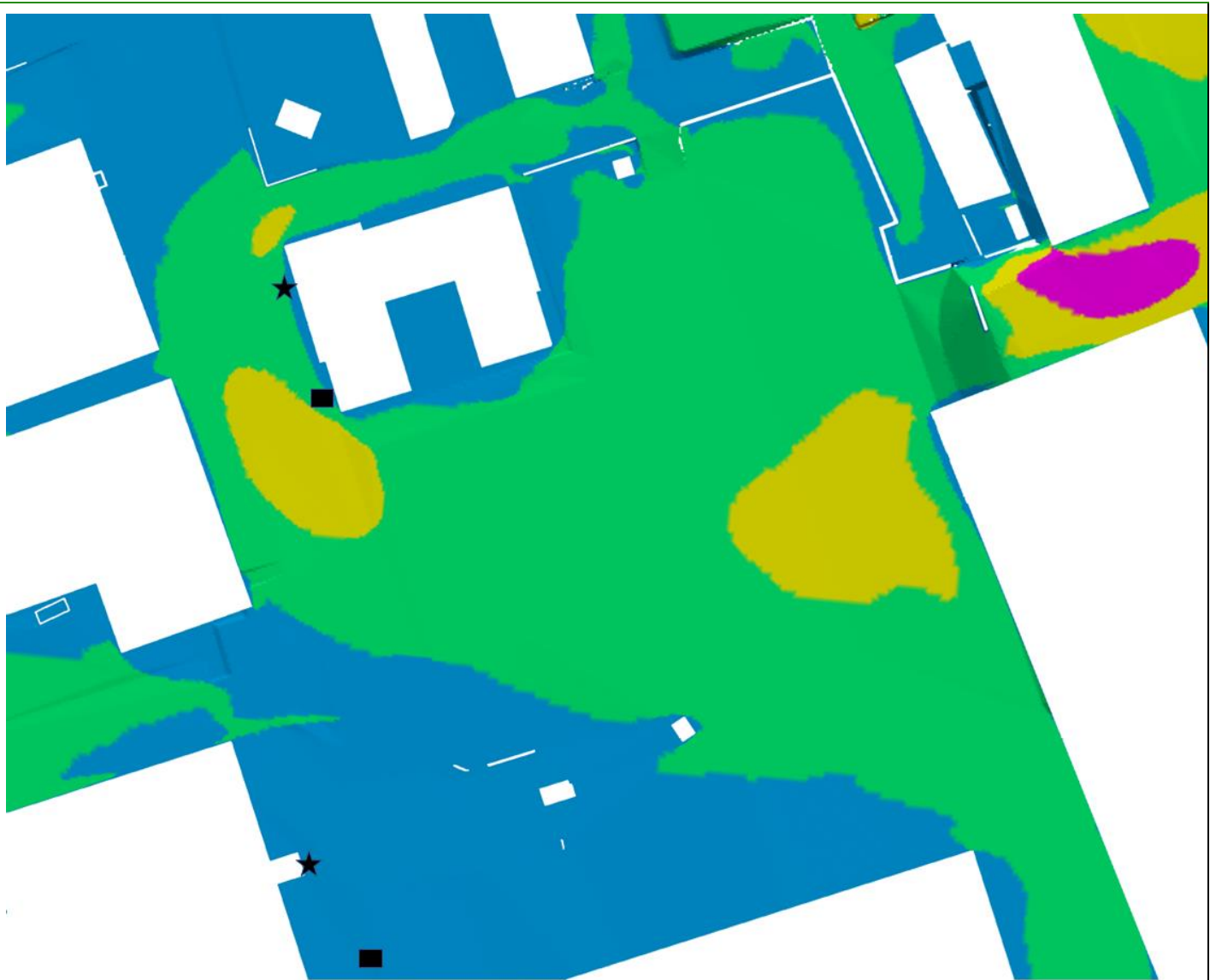
- Bus Stops
- ★ Key Off-Site Entrances

	Figure:	11.6		
	Title:	Scenario 1: Ground Level Wind Comfort (Summer)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



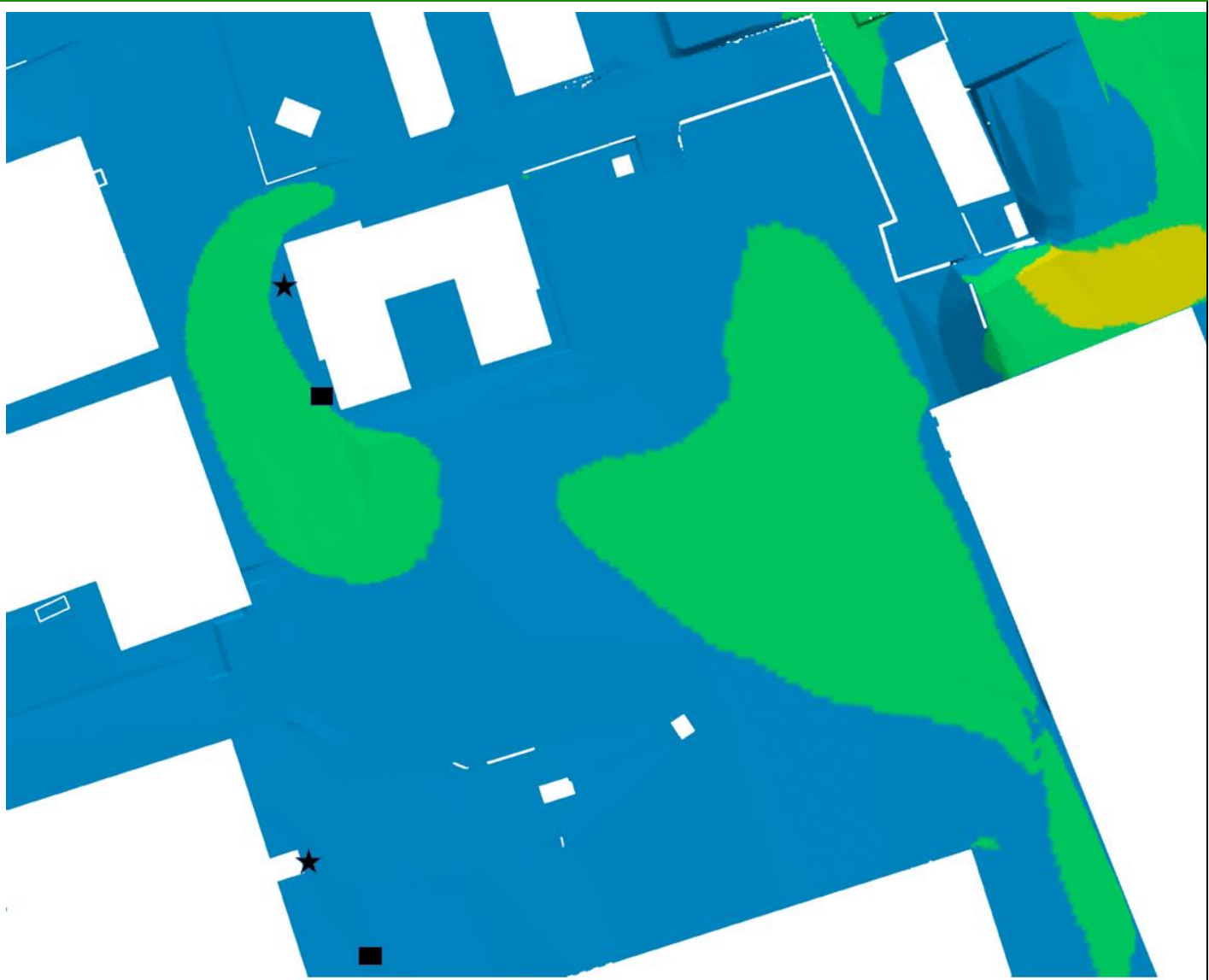
- Bus Stops
- ★ Key Off-Site Entrances

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	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



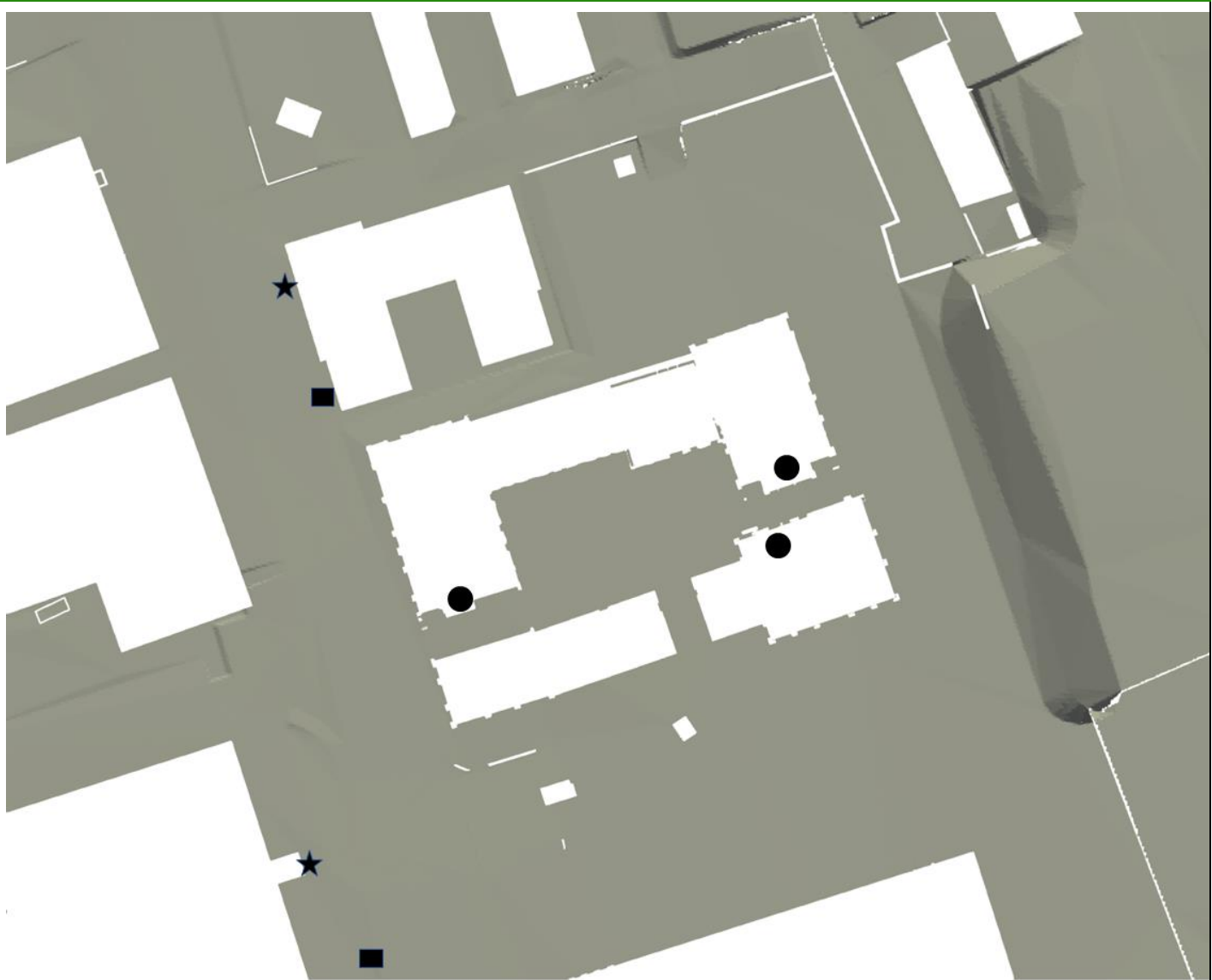
- Bus Stops
- ★ Key Off-Site Entrances

	Figure:	11.8		
	Title:	Scenario 2: Ground Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



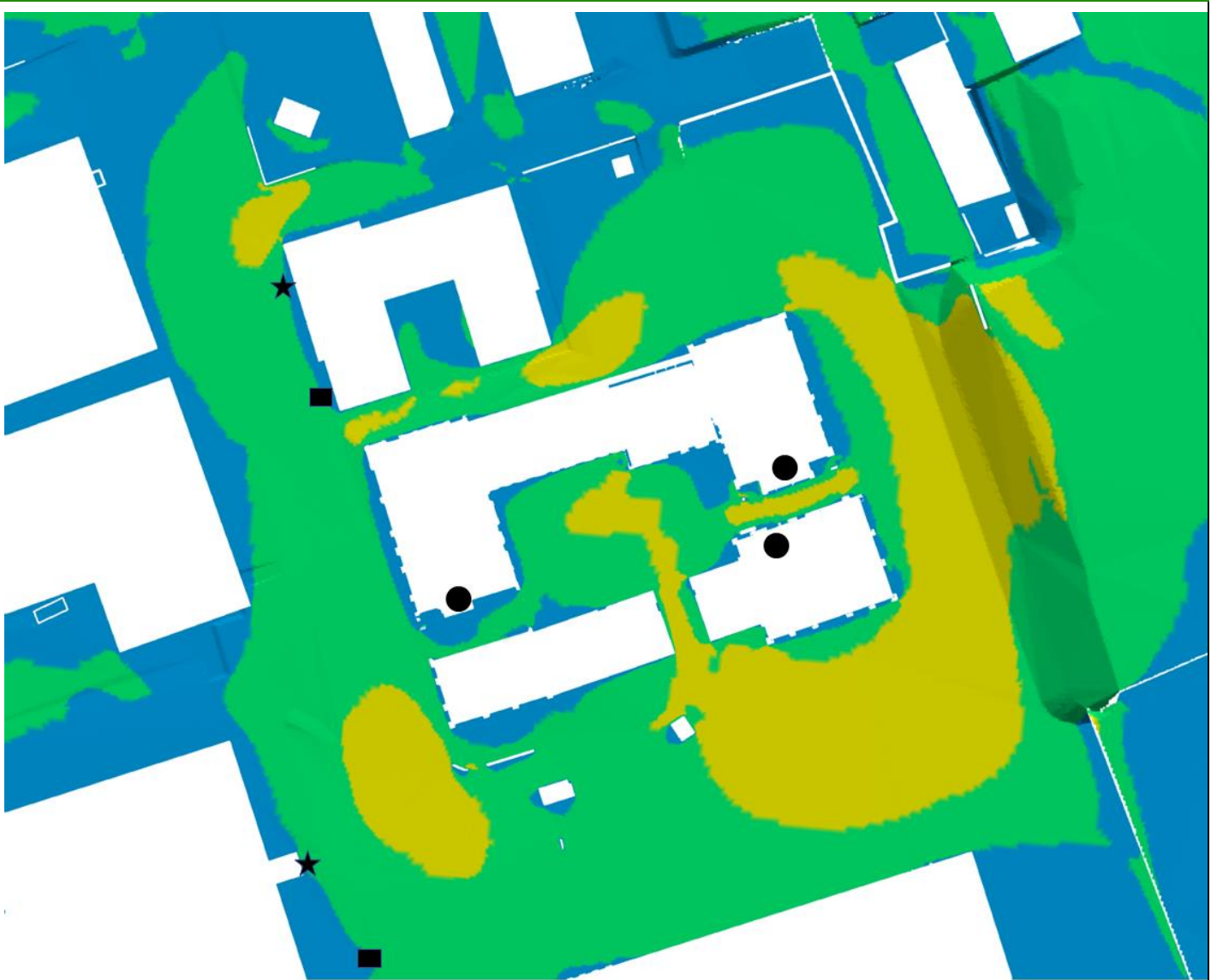
- Bus Stops
- ★ Key Off-Site Entrances

	Figure:	11.9		
	Title:	Scenario 2: Ground Level Wind Comfort (Summer)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

	Figure:	11.10		
	Title:	Scenario 3: Ground Level Wind Safety (Annual)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

	Figure:	11.11		
	Title:	Scenario 3: Ground Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

	Figure:	11.12		
	Title:	Scenario 3: Ground Level Wind Comfort (Summer)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

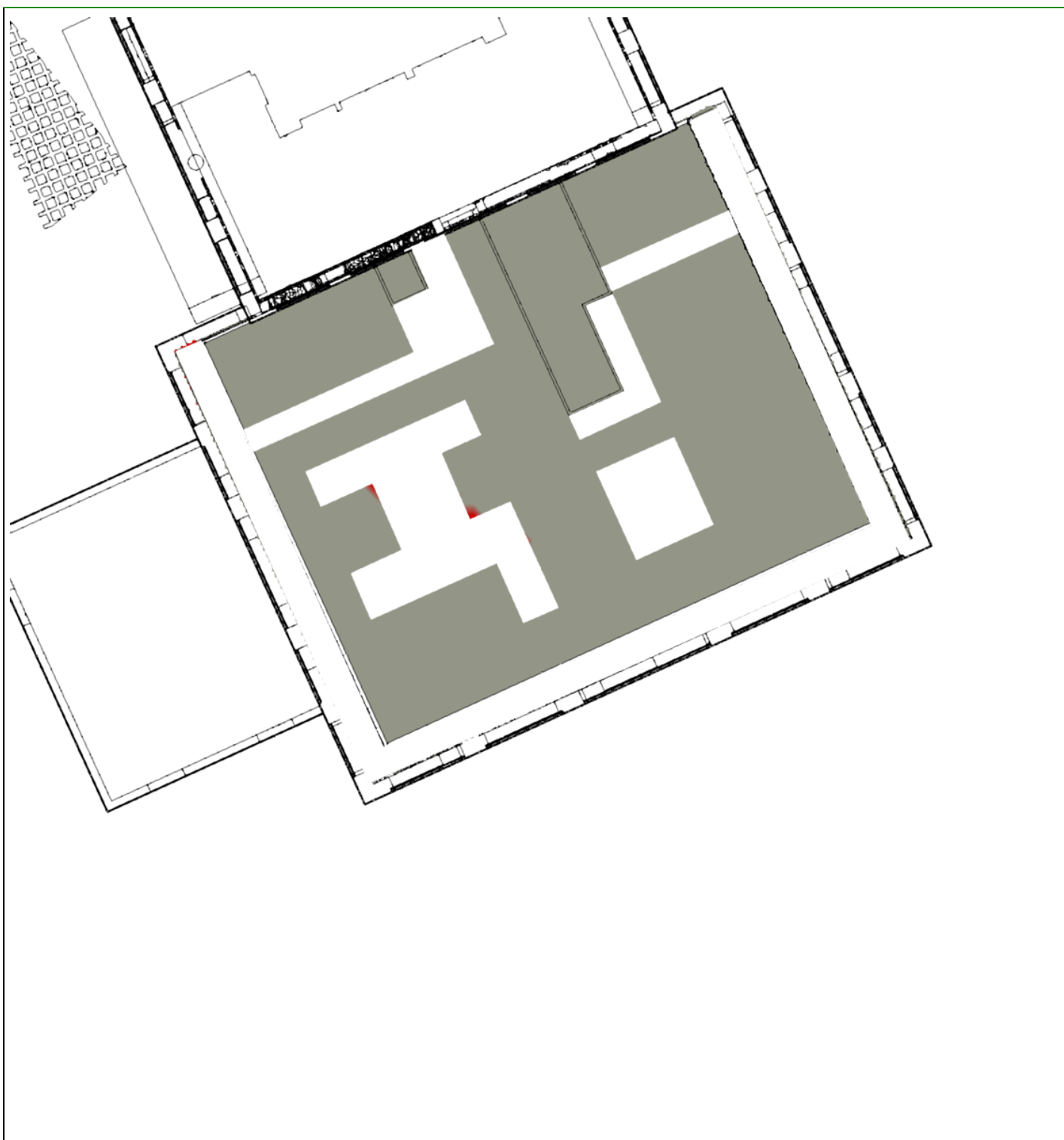


	Figure:	11.13		
	Title:	Scenario 3: Terrace Level Wind Safety (Annual)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



	Figure:	11.14		
	Title:	Scenario 3: Terrace Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

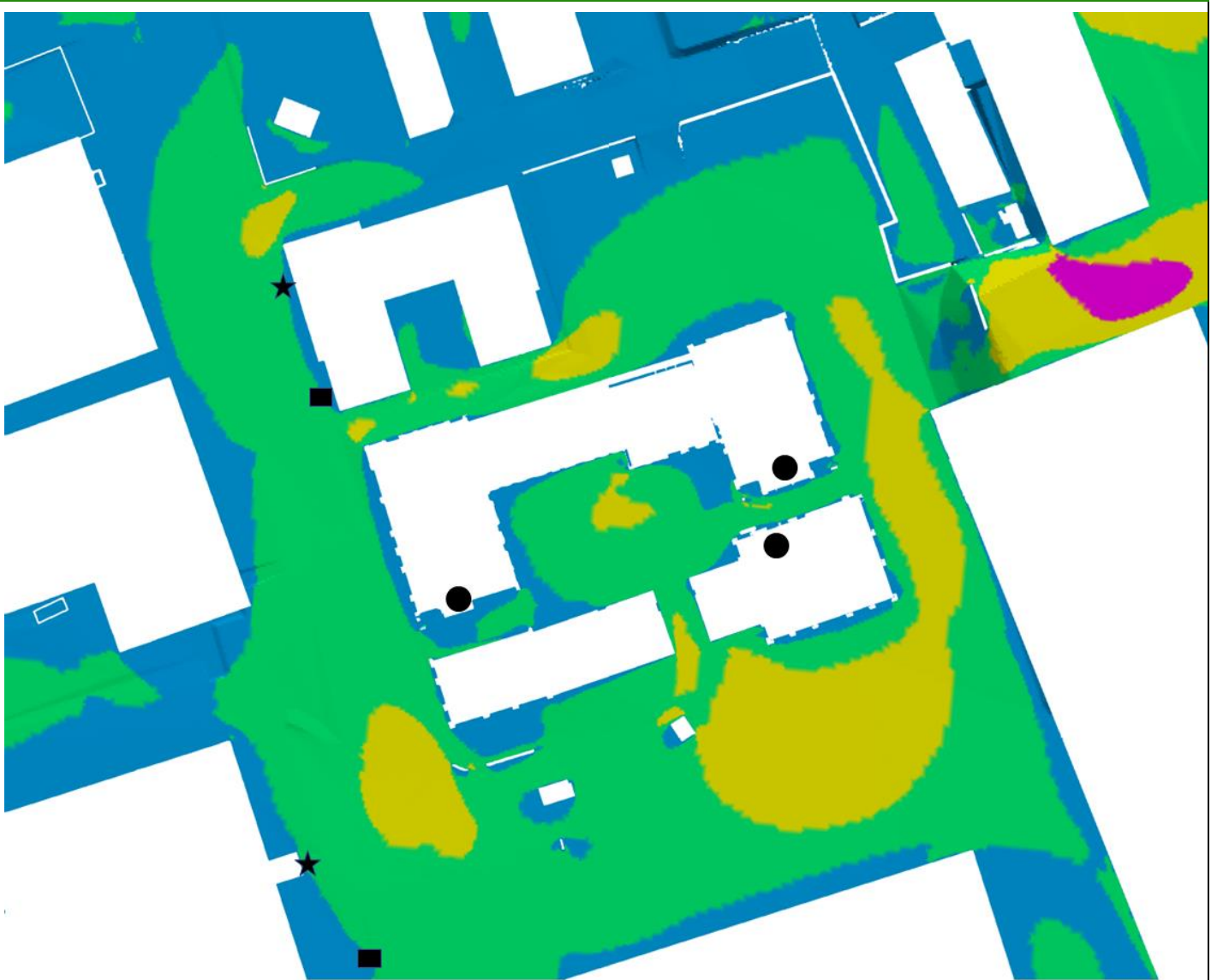


	Figure:	11.15		
	Title:	Scenario 3: Terrace Level Wind Comfort (Summer)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

	Figure:	11.16		
	Title:	Scenario 4: Ground Level Wind Safety (Annual)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

	Figure:	11.17		
	Title:	Scenario 4: Ground Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



- Bus Stops
- ★ Key Off-Site Entrances
- Key On-Site Entrances

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	Title:	Scenario 4: Ground Level Wind Comfort (Summer)		
	Project:	Boddingtons		
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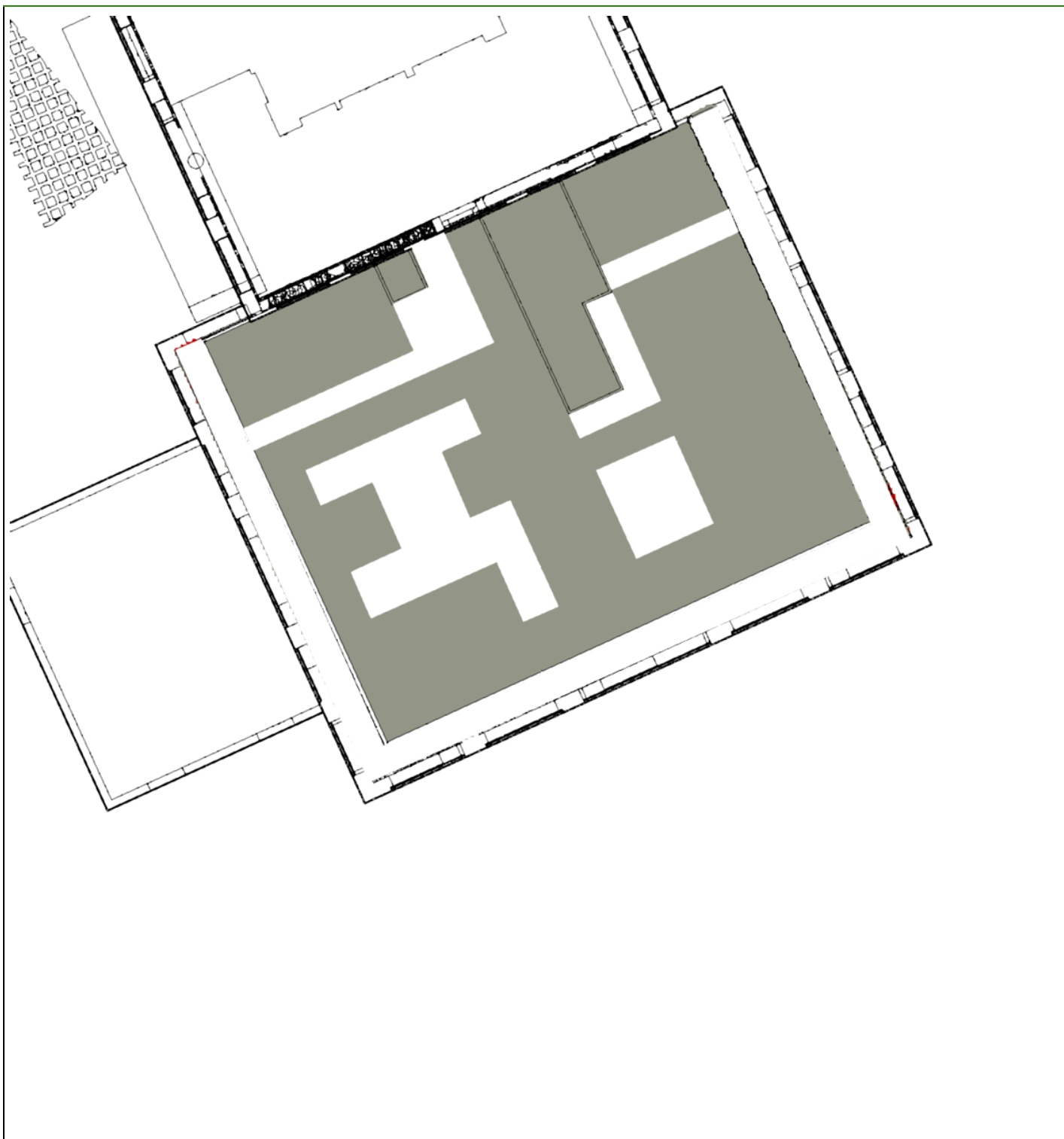


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	Title:	Scenario 4: Terrace Level Wind Safety (Annual)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS



	Figure:	11.20		
	Title:	Scenario 4: Terrace Level Wind Comfort (Winter)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

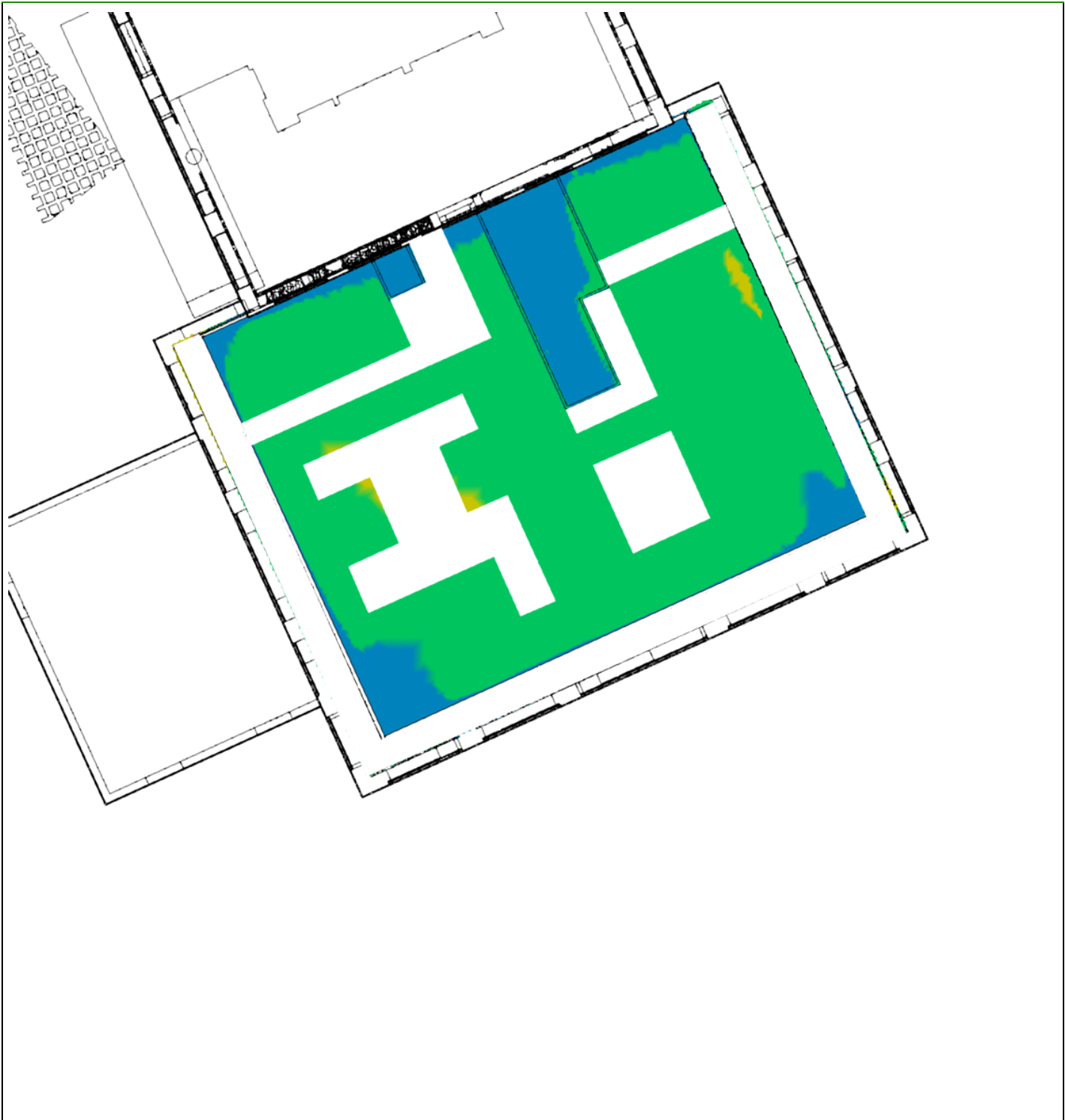


	Figure:	11.21		
	Title:	Scenario 4: Terrace Level Wind Comfort (Summer)		
	Project:	Boddingtons		
	Date:	24 November 2021	Scale:	NTS

Summary of Residual Impacts

- 12.1. The summary of the residual impacts from each technical chapter is set out below.

Air Quality

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Indeterminate ^a Dust Soiling Effects on Local Sensitive Receptors	Approximately ten human receptors at commercial premises near the Site including a hotel	See Table 6.15 to Table 6.18	Construction contractors routinely implement such mitigation measures. Construction dust management plan recommended.	Negligible Effects – Temporary
Indeterminate ^a Dust Related Human Health Effects on Local Sensitive Receptors	Approximately ten human receptors at commercial premises near the Site including a hotel	See Table 6.15 to Table 6.18	Construction contractors routinely implement such mitigation measures. Construction dust management plan recommended	Negligible Effects - Temporary
Operational Phase				
Negligible Effects from Local Emission Sources on On-site Receptors	14 On-Site Receptors on the First and Second Floor Facades	None	N/A	Negligible Effects – Permanent
Negligible Effects from the Site Generated Emissions on	Sensitive Receptors near Roads leading from the Site (no specific	None	N/A	Negligible Effects - Permanent

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Receptors in the Local Area	receptors modelled)			

Climate Change

Carbon Emissions

Likely Significant Effect	Receptor(s)	Proposed Mitigation Measure(s)	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Negligible, non-significant effect on climate (compared with UK emissions)	Atmosphere	Table 1.8	Through design changes to Proposed Development, setting up of supply chain, and implementation of construction processes	Negligible, non-significant effects on climate (compared with UK and Manchester City emissions)
Operational Phase				
Negligible, non-significant effect on climate (compared with UK emissions)	Atmosphere	Table 1.9	Through design changes to Proposed Development	Negligible, non-significant effects on climate (compared with UK and Manchester city emissions)

Climate adaption

Climate hazard	Potential impact	Adaptation measures	Residual Risk	Significance
Flooding	Pluvial and fluvial flooding could affect integrity of buildings and cause loss of life	- Building design includes appropriate EA allowances for fluvial flood risk, given site and development characteristics - Landscaping of site reduces pluvial flood risk, and drainage system design includes climate change allowances.	Low	Not significant
Water scarcity	Potential water supply limitation during severe droughts	Internal water efficiency measures	Low	Not significant
Extreme heat	Overheating of buildings, with particular health effects on elderly and vulnerable residents	- Building ventilation incorporated to avoid overheating - Green spaces and a landscaped courtyard	Low	Not significant

Daylight and Sunlight

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Daylight	Scoped Out	-	-	-
Sunlight	Scoped Out	-	-	-
Operational Phase				
Daylight	Surrounding Residential Properties	None Required	N/A	Minor Permanent Adverse (Non-Significant Effect)
Sunlight	Surrounding Residential Properties	None Required	N/A	Minor Permanent Adverse (Non-Significant Effect)

Human Health

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Risk of injury and death – construction traffic	Wider groups & all vulnerable groups	Consultation will take place with the relevant Officers in Manchester City Council, regarding any road closures, diversions etc. A Construction Traffic Management Plan will be prepared to allow ongoing access where possible and minimise potential disruption and severance for communities nearby. This will include overnight and weekend closures where possible. Any such works will be consulted upon with local residents or facilities that are likely to be affected by the works to direct users during construction and support access to local facilities. With appropriate mitigation measures in place to minimise the risk of injuries and death, no significant effects are predicted for the physical and human receptors.	Construction Traffic Management Plan	Slight adverse (not significant) Temporary, direct, short-term and reversible
Risk of Injury and death – trespass to site compounds	Wider groups & Vulnerable group of children and adolescents	Site compounds would be established in accordance with a strict Construction Methodology, adhering to all appropriate standards and which includes the establishment of traffic management systems and appropriate, safe	Construction Method to adhere to appropriate standards	Slight adverse (not significant) Temporary, direct, short-term and reversible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
		access. Plant and equipment would be safely delivered to site, outside of peak hours, as required depending on the stage of the works and securely stored. Compounds would be made fully secure with on-site security, appropriate security fencing and lighting installed to provide visibility for onsite security staff. Mobile welfare would also be available. With these measures in place, it is not predicted there would be any significant effects on the physical or human receptors.		
Risk of Injury and death – utilities and buried services	Wider groups – contractors working on development	All clearance and construction work, including works potentially affecting electricity, gas, water and sewage supplies will be undertaken under the applicable Health and Safety legislation and best practice guidance pertaining at that time. Utility diversion works will be managed in accordance with the appropriate legislation and guidelines applicable at that time. The Construction Method Statement will detail the arrangements for responding to the unexpected discovery of utilities - even if utilities have not been identified in any surveys. This should include emergency contact details for all utilities operating in the location of construction and arrangements for isolating and securing the affected area. With appropriate mitigation measures in place to minimise the risk of injuries and death, no significant effects are predicted for the physical and human receptors.	Construction Method to adhere to appropriate standards	Slight adverse (not significant) Temporary, direct, short-term and reversible
Transport Options & Active Travel - Health outcome from temporary closure, modification, diversion or	Wider groups	Provision of a Construction Traffic Management Plan to ensure that if required, diversions are in place and are set up in accordance with relevant guidance in relation to signage etc. Inclusion of temporary bus stops if required. Liaison with bus operators to explore temporary	Traffic Management Plan	Slight adverse (not significant) Temporary, direct, short-term and reversible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
disruption to local roads and routes Disruptions to normal activities / journeys		timetables if required. Liaison with local communities to ensure any changes to public transport are communicated well in advance.		
Work & Training - Access	Wider groups	Liaison with local business owners to ensure any changes to access are communicated well in advance and arrangements made to maintain access.	Communications Plan	Slight adverse (not significant) Temporary, direct and indirect, short-term
Operational Phase				
N/A	N/A	N/A	N/A	N/A

Townscape and Visual Impact

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase				
Minor Adverse	Townscape Character Area 1: Strangeways	Controlling the lighting of construction compounds and machinery to minimise upward and outward light pollution through lantern design, direction and baffling, and ensuring that the minimum area only is lit, for the minimum period of time while satisfying other health and safety requirements; Restricting the movement of stockpiles to minimise vehicle tracking across the Site and perception of instability in the townscape; and Locating compounds and stockpiles in the least visible locations with the Site, including for rendering of facades to aid in integrating their form within views.	Adoption of CEMP	Minor Adverse – non-significant Temporary
Major Adverse	Townscape Character of the Site			Major Adverse - significant Temporary
Minor Adverse	Viewpoint 4			Minor Adverse – non-significant Temporary
Moderate Adverse	Viewpoint 7			Moderate Adverse – significant Temporary
Operational Phase				
Moderate Beneficial	Townscape Character	The embedded mitigation measures of implementation and maintenance of the hard and soft	Adoption of an appropriate landscape	Moderate Beneficial – significant Permanent

	Area 1: Strangeways	landscape proposals throughout the lifetime of the Development, including advanced planting where practicable (and within first available planting season).	management strategy	
Major Beneficial	Townscape Character of the Site			Major Beneficial – significant Permanent
Moderate Beneficial	Viewpoint 4			Moderate Beneficial – significant Permanent
Moderate Beneficial	Viewpoint 7			Moderate Beneficial – significant Permanent

Wind Microclimate

Likely Significant Effect	Receptor(s)	Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e. Temporary/Permanent)
Construction Phase			
Negligible effects on wind microclimate	General Thoroughfares	None required	Negligible effects on wind microclimate
Negligible effects on wind microclimate	Bus Stops	None required	Negligible effects on wind microclimate
Negligible effects on wind microclimate	Building Entrances	None required	Negligible effects on wind microclimate
Operational Phase			
Negligible effects on wind microclimate	General Thoroughfares	Embedded mitigation as part of the building design and associated landscaping.	Negligible effects on wind microclimate
Moderate-minor beneficial effects on wind microclimate	Bus Stops	None required.	Moderate-minor beneficial effects on wind microclimate
Negligible effects on wind microclimate	Building Entrances	Embedded mitigation as part of the building design and associated landscaping.	Negligible effects on wind microclimate
Negligible effects on wind microclimate	Courtyard Amenity	Embedded mitigation as part of the building design and associated landscaping.	Negligible effects on wind microclimate
Negligible effects on wind microclimate	Podium Terrace Amenity	Embedded mitigation as part of the building design and associated landscaping.	Negligible effects on wind microclimate

Type 1 Cumulative Effects

Introduction

- 13.1. This section gives consideration to 'Type 1' cumulative effects.
- 13.2. The assessment is informed by the results of the technical assessments as set out in Chapter 6 - 11 of the ES. It is based on professional opinion and experience of Deloitte in capacity as the EIA coordinator.
- 13.3. Type 1 cumulative effects are also known as 'inter-project' effects, which are the combined effects arising from the Proposed Development upon a set of defined sensitive receptors.
- 13.4. 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

- 13.5. 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'.
- 13.6. The EIA Regulations require 'a description of the likely significant effects', including cumulative effects.
- 13.7. 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

- 13.8. 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

- 13.9. 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.
- 13.10. 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'.
- 13.11. 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

- 13.12. 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.
- 13.13. 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.
- 13.14. 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.
- 13.15. 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.
- 13.16. 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.
- 13.17. 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

- 13.18. 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.
- 13.19. 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

- 13.20. 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.
- 13.21. 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

Construction Phase

- 13.22. Based on the methodology detailed above, Table 13.1 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.

Townscape and Key Views	Minor-Major adverse impact on the surrounding townscape and key views. This is a temporary impact and which is typical of a construction project. The effects will lessen over time as the development progresses to a more finalized form.	No likely significant Type 1 cumulative effects

- 13.23. Table 13.1 shows that there is unlikely to in-combination construction phase Type 1 cumulative effects. The proposals construction methods are typical of an urban construction project and the ES has identified a number of key mitigation measures to be employed during the construction phase to mitigate and minimise construction impacts. These mitigation measures are expected to be secured by a Construction and Environmental Method Plan, which is standard construction best practice, to be agreed between the Applicant and MCC as a planning condition.

Operational Phase

- 13.24. Based on the methodology detailed above, Table 13.2 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.

Neighbouring Properties	Minor Permanent Adverse (Non-Significant Effect) on daylight and sunlight of neighbouring residential properties.	No likely significant Type 1 cumulative effects
Local Pedestrian Environment	Moderate-minor beneficial effects on wind microclimate at identified bus stop receptors.	No likely significant Type 1 cumulative effects

Townscape and Key Views	Moderate-Major beneficial impact on the surrounding townscape and key views.	No likely significant Type 1 cumulative effects
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- 13.25. Table 13.2 shows that there is unlikely to be in-combination operational phase Type 1 cumulative effects to arise. This is due to the extensive technical assessments throughout the design process and the identified mitigation in-built into the design.

Mitigation measures.

- 13.26. Where relevant, the individual residual effects which contribute to the potential cumulation have been considered within the ES and mitigated where necessary and feasible.
- 13.27. No mitigation is proposed for the identified Type 1 cumulative effects.



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