



Crown Street Phase 3 and Plot D Environmental Statement: Volume 1

June 2023

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1. Introduction

- 1.1. This Environmental Statement ('ES') has been prepared in respect of two separate planning applications submitted to Manchester City Council ('MCC') both for a residential led, mixed-use development on adjacent sites located within the Great Jackson Street Development Framework Area of Manchester City Centre. The first application relates to Plots C (part) and Plot E (collectively referred to as Crown Street Phase 3) with the second application relating to Plot D as identified in Figure 1.1.

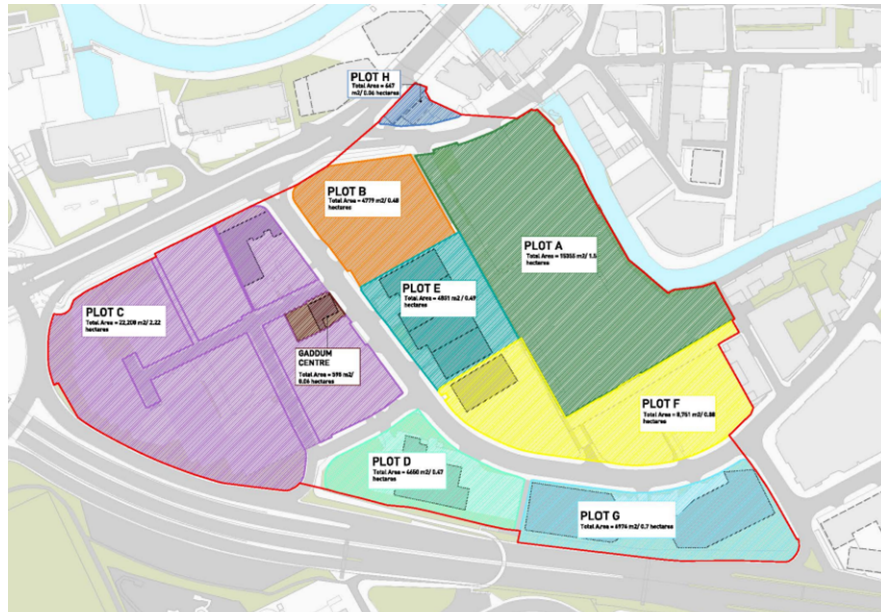


Figure 1.1 GJS Development Framework Plots with Site Boundary (source: Great Jackson Street Development Framework, 2018).

- 1.2. As the two planning applications are adjacent to one another and are being submitted concurrently by Renaker Build Ltd ('the Applicant'), the environmental impacts of both applications are considered holistically by the Environmental Impact Assessment ('EIA') and are jointly referred to as 'the EIA Site' and the 'Proposed Development'.
- 1.3. The EIA Site measures approximately 2 ha. The two component planning application sites comprise:
- Crown Street Phase 3: bound by Silvercroft Street and Owen Street Car Park to the north, Melbourne Street and Plot F to the south, Owen Street and Deansgate Square to the east, and the under construction Crown Street Phase 2 to the west.
 - Plot D: bound by Great Jackson Street to the northeast, the A57(M) Mancunian Way to the South, Melbourne Street to the northwest, public footpath to the east and a warehouse beyond.

- 1.4. The Planning Applications seek permission for the following:

Crown Street Phase 3

“Full planning permission for the demolition of existing structures and the phased construction of four residential buildings ranging from 47 to 51 storeys to provide a mix of and providing 1,746 homes (Use Class C3), flexible commercial, leisure, food and drink uses (all Use Class E) and / or drinking establishment (Sui Generis), basement car parking, cycle parking, landscaping and public realm, servicing and access arrangements, highways alterations and associated works.”

Plot D

“Full planning permission for the demolition of existing structures and the erection of one residential building to a height of 71 storeys and comprising 642 homes (Use Class C3) with food and drink uses (Use Class E) and / or drinking establishment (Sui Generis); and one office building (Use Class E); with basement car parking, cycle parking, landscaping and public realm, servicing and access arrangements, highways alterations and associated works.”

- 1.5. Full details of the Proposed Development are provided at Chapter 4 of this ES. A detailed description of the proposals is provided in Section 5 of the Planning and Tall Building Statement and within the Design and Access Statement submitted in support of each Application.
- 1.6. The proposed phasing plan is included at Figure 1.3 to this ES Chapter.
- 1.7. This ES sets out the findings of an EIA carried out in respect of the Proposed Development of the Site.

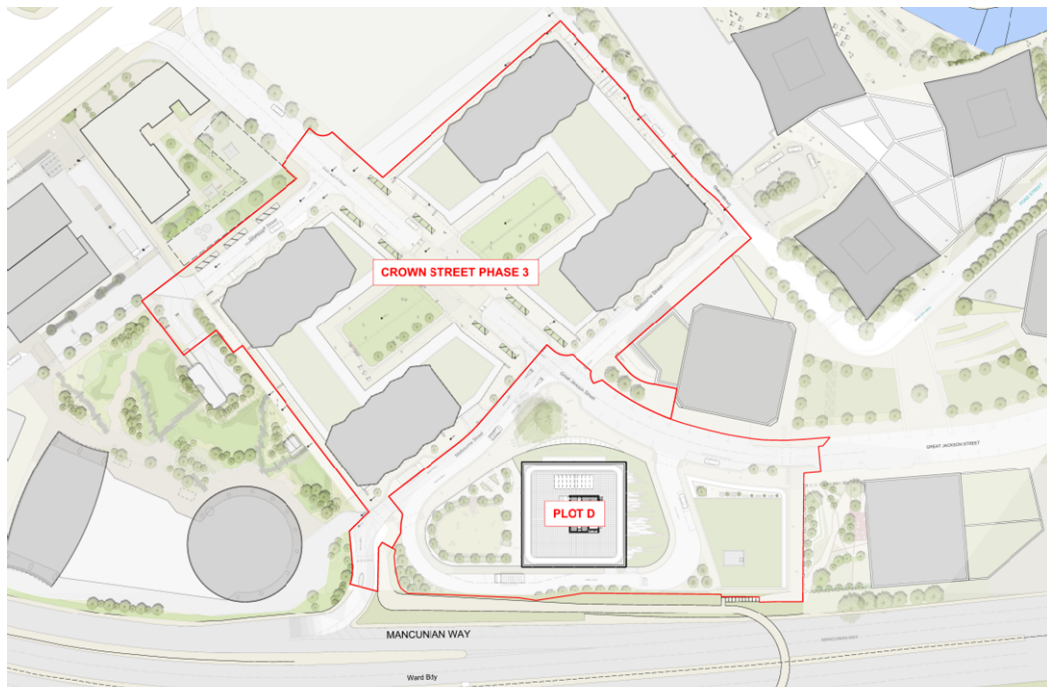


Figure 1.2: Phase 3 Planning Application Boundary (source: SHP)

Requirements for EIA

- 1.8. 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.
- 1.9. 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 the likely significant effects on the environment. The assessment compares the existing situation at the start of the work (baseline) with the situation during demolition and construction, and when the Proposed Development is operational.
- 1.10. 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 (Regulation 2(b)).
- 1.11. The Proposed Development is considered likely to fall under the category of “urban development projects” (Schedule 2, 10, (b)) where:
- The development includes more than 1 hectare of urban development which is not dwelling house development; or
 - The development includes more than 150 dwellings; or
 - The overall area of the development exceeds 5 hectares
- 1.12. A formal EIA scoping request was submitted to Manchester City Council (MCC) on 14th March 2023 requesting formal confirmation as to the proposed scope of the Environmental Impact Assessment required in respect of the Proposed Development. The technical chapters are based on a scope of assessment that has been agreed with the relevant statutory consultees. A copy of the scoping report is included in Appendix 2.1.
- 1.13. This application will be submitted prior to receiving a formal scoping response; however, it is in line with the requirements of statutory consultees and each chapter of this EIA sets out the relevant legislation, policy and guidance that has been followed.
- 1.14. In accordance with the EIA Regulations, this ES sets out the following information:
- A description of the Proposed Development comprising information on the site, design, size and other relevant features of the development;
 - A description of the likely significant effects of the Proposed Development on the environment;
 - A description of any features of the Proposed Development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
 - A description of the reasonable alternatives studied by the developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
 - A non-technical summary of the information, of the information specified above; and
 - Any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

Project Team

- 1.15. Deloitte has significant experience and expertise in managing the EIA process and holds the IEMA EIA Quality Mark. Deloitte has managed the EIA process and has received technical input from a range of technical consultees. Details of the EIA Technical Team, their experience and qualifications are set out in Table 1.1 below.

Table 1.1: EIA Technical Team

Company	Discipline	Author Experience and Qualification(s)
Enzygo	Air Quality	7 years' experience preparing air quality ES Chapters for a wide range of sectors and clients and is a member of the Institute of Air Quality Management (IAQM).

Company	Discipline	Author Experience and Qualification(s)
Curtins	Transport	MSc in Transport Planning & Practice with over 17 years' experience in development planning. A Chartered Member of the Institute of Logistics and Transport and a Member of the Chartered Institution of Highways and Transportation.
Eksogen	Socio-economic	BA (Hons) and PhD in Human Geography; 17 years' experience in economic development as a whole, and nine years' experience in undertaking a range of socio-economic assessments.
Fisher Acoustics	Acoustics	Chartered Engineer, holds a First Class Bachelor of Engineering in applied acoustics and has 31 years' post-graduate experience in acoustic consultancy, including the compilation of EIA Chapters for numerous large-scale developments.
GIA	Daylight & Sunlight Overshadowing and Solar Glare	7 years of UK experience working on Solar Glare EIA matters for large-scale development throughout the UK. They have a Masters with Distinction in Building Science (MBS) from Victoria University of Wellington (New Zealand) and also have 7 years of NZ industry experience
WSP	Wind Microclimate	A Fellow of the Institute of Civil Engineers and the current Chairman of the UK Wind Engineering Society. 20 years' experience in the provision of wind engineering consultancy services, with more than 50 publications in technical and industry journals.
WSP	Climate Change	M. Plan, Environment degree and has experience in preparing Climate Change Chapter for EIA developments of 3 projects till date.
Chris Burnett Associates	Townscape & Visual Impact	BSc; BLD; CMLI, of this input has experience of preparing over 40 Tall Building assessments as part of EIAs.
Enfusion	Human Health	BSc, MSc, CEnv, FIEMA and over 25 years' experience in preparing for EIA developments. Co-author of the practical guide – the EIA Handbook (Telfords, Third Edition, November 2019).
Deloitte LLP	Planning Consultant & EIA Coordinator	MRTPI and IEMA Quality Mark with over 7 years experience of coordinating EIAs, including at Great Jackson Street.
Renaker	Construction	BEng Civil Eng and has worked in the construction industry for over 35 years, delivering the largest retail construction projects in the U.K. and Europe. Latterly he has been responsible for the design and construction of some of the tallest residential buildings in the U.K.

Phasing and EIA Scenarios

1.16. The Proposed Development will be phased in order to facilitate the delivery process of each part of the scheme and a phasing plan is provided as Figure 1.2 to this chapter. This is as submitted in the EIA scoping report. The sequence of phased delivery is proposed as follows:

- Phase 1: Plot D2 Office Building

- Phase 2: Crown Street Phase 3 Plot E2
- Phase 3: Crown Street Phase 3 Plot E1
- Phase 4: Crown Street Phase 3 Plot C8
- Phase 5: Crown Street Phase 3 Plot C7
- Phase 6: Plot D1 Residential Tower

1.17. Phase 1, the three-storey office building, has been considered by the EIA disciplines as being capable of coming forward at any stage of the development. This is to allow a degree of flexibility in preparing for and delivering the larger development plots and ensuring the finished building aligns with future occupier timescales.

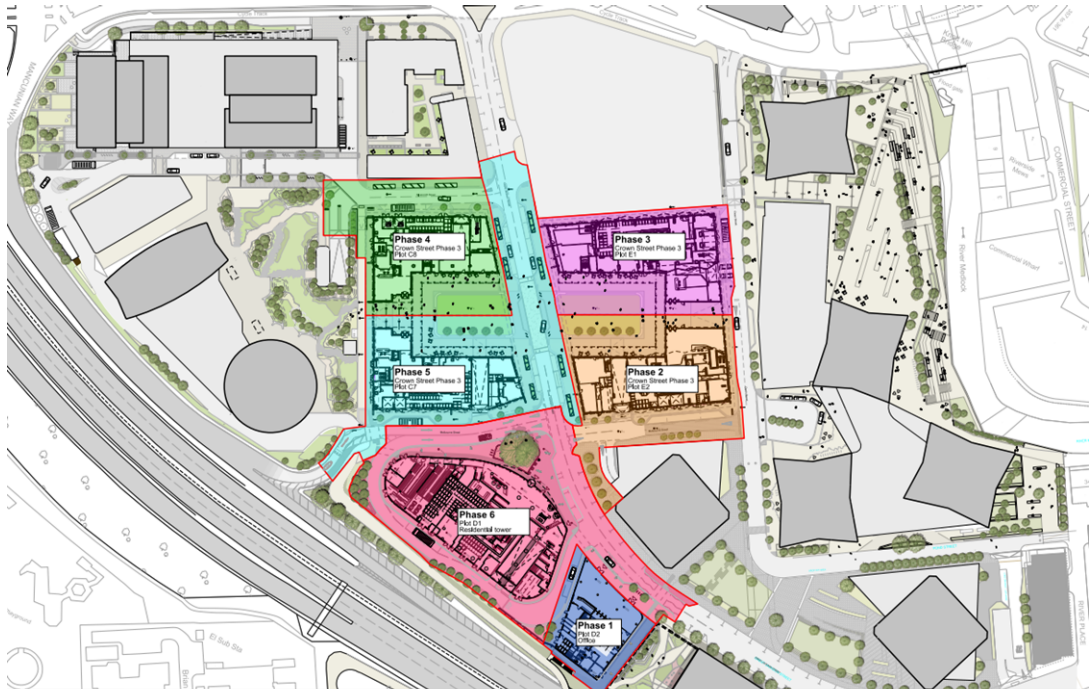


Figure 1.3: Crown Street Phase 3 and Plot D Phasing Plan (source: SHP)

1.18. The EIA has considered the sequence of phased delivery outlined above. These have been devised so that environmental effects arising from the phasing of the development are robustly assessed. The proposed EIA scenarios are:

- Scenario 1: Baseline
- Scenario 2: Baseline + Phase 1
- Scenario 3: Baseline + Phase 1 + Phase 2
- Scenario 4: Baseline + Phase 1 + Phase 2 + Phase 3:
- Scenario 5: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4
- Scenario 6: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5
- Scenario 7: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6
- Scenario 8: Baseline + Phase 1 + Cumulative
- Scenario 9: Baseline + Phase 1 + Phase 2 + Cumulative
- Scenario 10: Baseline + Phase 1 + Phase 2 + Phase 3 + Cumulative
- Scenario 11: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + cumulative
- Scenario 12: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + cumulative
- Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative

- 1.19. Each consultant has reviewed the scenarios and have assessed those that are relevant for their discipline. The EIA scenarios that are assessed by each consultant are summarised below:

Table 1.2: Summary of EIA Scenarios and Relevant Technical Consultants

Chapter	Company	Scenarios Tested
Air Quality	Enzygo	Scenario 1 and 13
Transport Assessment	Curtins	Scenario 1 and 7
Socio-economic Impact	Eksogen	All scenarios
Noise Impact	Fisher Acoustics	Scenario 1 and 13
Daylight & Sunlight Overshadowing	GIA	Scenario 1 and 13
Solar Glare	GIA	Scenario 7
Wind Microclimate	WSP	Scenario 1, 5, 7 and 13
Climate Change	WSP	Scenario 7
Townscape & Visual Impact	Chris Burnett Associates	Scenario 1 and 13
Human Health Assessment	Eskogen	Scenario 1, 7 and 13

Organisation of the Environmental Statement

- 1.20. This ES comprises 17 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.
- 1.21. Figures have been referenced using the chapter number as a prefix followed by the number of the figure within a given chapter. Appendices have been referenced in the same way but due to their size they are contained separately in Volume 2. Table 1.3 sets out the structure of the ES.

Table 1.3: EIA Chapters

Chapter No.	Chapter Title	Description
VOLUME 1		
1	Introduction	Introduction to the ES, EIA requirements, details of the project team, ES organisation and availability.
2	EIA Methodology	Methods used to prepare each chapter, description of ES structure and content, generic significance criteria, scoping and consultation.
3	Alternatives and Design Evolution	Outline of the main alternatives considered by the Applicant.
4	Site and Development Description	Site description and details of the Proposed Development.
5	Construction Phasing and Methodology	Details of anticipated programme for development and construction methodology are also included.
6	Air Quality	Assessment of the air quality indicators and their relationship with nearby sensitive receptors driven by traffic generation.
7	Climate Change	Presents the methods and scope of the assessment that will examine the Proposed Development's impact on, and vulnerability to climate change.

Chapter No.	Chapter Title	Description
8	Daylight, Sunlight and Overshadowing	Presents an assessment of the potential effects of the proposals on daylight, sunlight and overshadowing, which will be identified through desk-based research, site surveys and consultation with key stakeholders.
9	Noise and Vibration	An assessment that will consider the potential impact of noise and vibration from the Proposed Development on the surrounding noise sensitive receptors during the construction and operational phases.
10	Human Health	Examines the likely human health impacts of the Proposed Development on the site and surrounding area, including an assessment of physical and mental health.
11	Solar Glare	Presents an assessment of the potential effects of the proposals on solar glare on identified receptors.
12	Townscape and Visual Impact	Assessment of the potential effects of the proposals on townscape and visual impact, which will be assessed as a function of both the magnitude of the impact or change and the sensitivity of the townscape resource or visual receptor affected.
13	Traffic and Transport	Assessment of the potential environmental impacts of traffic generated by the Proposed Development during the construction and operational phases.
14	Wind Microclimate	Assessment of the impact of the Proposed Development on the pedestrian level wind environment across the Site and its surroundings.
15	Socio Economic	Assessment of the likely significant effects of the Proposed Development with respect to the socio-economic environment, including population, employment, housing and expenditure and other socio-economic indicators.
16	Type 1 Cumulative Effects	Review of inter project effects, which are combined effects arising from the Proposed Development on defined sensitive receptors.
17	Summary of Residual Effects	Summary of the effects that remain after mitigation.
VOLUME 2	Technical Appendices	Technical data and reports to support the chapters in Volume 1.
	Non-Technical Summary	Summary of the ES in non-technical language.

Other Documents

- 1.22. Together with this ES, the following documents will be submitted to MCC as part of each planning application. These non-ES documents include:

Table 1.4: EIA Submission Documents

Document	Prepared By
Location Plan	SHP
Existing Site Plan and Elevations	SHP
Planning Application Drawings – Proposed Plans, Elevations and Sections	SHP
Planning and Tall Building Statement	Deloitte
Phasing Plan	SHP
Landscape Plans	TPM Landscape

Document	Prepared By
Statement of Consultation	Deloitte
Design and Access Statement	SHP with input from TPM Landscape
Landscaping Design Statement	TPM Landscape
Green and Blue Infrastructure Statement (included in Planning and Tall Building Statement)	Deloitte
Lighting Strategy	SHP
Arboricultural Report	Godwins
Archaeological Desktop Study	Salford Archaeology
Broadband Connectivity Assessment	Pager Power
TV Reception Survey	Pager Power
Safety Assessment (Manchester Airport)	Pager Power
Crime Impact Statement (CIS)	GMP
Phase 1 Ground Conditions Report	WSP
Ecology Appraisal	ERAP
Environmental Standards Statement (ESS) and Energy Statement	Element Sustainability
Local Benefits Proposal	Renaker
Development Management Strategy	Zenith
Servicing Strategy (included within Transport Statement)	Curtins
Site Waste Management Strategy (included within the DAS)	SHP
Ventilation Statement	FutureServ
Viability Assessment	Renaker
Flood Risk Assessment and Drainage Strategy	Curtins
Heritage Statement	SLHA
Fire Statement (residential)	Tenos

Environmental Statement Availability

- 1.23. The ES is available for public viewing on Manchester City Council's Public Access website at the following address: <http://pa.manchester.gov.uk/online-applications/> once the application has been submitted and validated.
- 1.24. The ES may be purchased in volumes, the costs for which are set out below:
- Volume 1: ES Main Text and Figures - £150.
 - Volume 2: ES Appendices - £150.
 - Volume 3: Non-Technical Summary (NTS) - £15
 - Full Copy (Volumes 1, 2 and 3) of the ES on CD - £15.

- 1.25. For copies of any of the above, please contact the Manchester Planning Team at Deloitte Real Estate.
- Crown Street Phase 3 and Plot D GJS Project Team – Planning and EIA
Deloitte Real Estate
Hanover Building
Corporation Street
Manchester
M4 4AH

2. EIA Methodology

Introduction

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

Legislation and Guidance

- 2.2. The ES has been prepared to comply with EIA Regulations, which implement European Council Directive No. 85/337/EEC as amended by Directive 2014/52/EU which entered into force on the 17 May 2017. The EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies. The European Union (Withdrawal) Act 2018 introduced "retained EU law" which provides that EU-derived domestic legislation continues to have effect.
- 2.3. Reference has also been made to currently available good practice guidance in EIA including:
- National Planning Practice Guidance – Department for Communities and Local Government, March 2014 (and continuously updated as a 'live' resource).
 - Impact Assessment Guidelines and ES Review Criteria, Institute of Environmental Management and Assessment (IEMA), 2004.
 - Guidance on EIA, EIS Review, European Commission, June 2001.
 - Guidance on EIA Scoping, European Commission, June 2001.
 - Guidance on Transport Assessment, DCLG and DfT, March 2007.
- 2.4. Reference has been made to the Institute of Environmental Management and Assessment (IEMA) publications, including:
- IEMA ES Review Criteria
 - IEMA Guidelines for Environmental Impact Assessment (2004)
 - IEMA Special Report into the State of Environmental Impact Assessment Practice in the UK (2011)
 - IEMA Shaping Quality Development (2015)
 - IEMA Delivering Quality Development (2016)
 - IEMA Delivering a Proportionate EIA (2017)
- 2.5. The ES has also had regard to the National Planning Policy Framework 2021 (NPPF). The NPPF sets out the Government's economic, environmental and social planning policies for England, articulating the Government's aspiration for sustainable development. The NPPF has been considered where it is relevant to EIA.
- As relevant to the ES technical chapter's scope, methodology and assessment of effects, key local planning policy and guidance documents have been considered. These include:
 - Manchester City Council Core Strategy (2012)
 - Saved Unitary Development Plan Policies (1995)
 - Any additional planning policy or guidance documents considered relevant have been identified within the relevant technical chapters.

Screening and Scoping and Consultation

Scoping

- 2.6. A formal EIA scoping request was submitted to MCC on 14 March 2023 requesting formal confirmation as to the proposed scope of the EIA required in respect of the Proposed Development. The technical chapters are based on a scope of assessment that has been agreed with the relevant statutory consultees where possible. A copy of the scoping report is included in Appendix 2.1.
- 2.7. A formal response to the EIA Scoping Request has not been received at the time of submission; however, pre-application engagement discussions with MCC and other technical stakeholders have taken place, as outlined in the Statement of Consultation.
- 2.8. Where appropriate, the author of each technical chapter has also liaised directly with relevant officers at Manchester City Council and statutory consultees to discuss and agree the scope of each discipline.
- 2.9. The agreed scope is detailed with the 'Assessment Methodology and Significance Criteria' section of each Technical Chapter.
- 2.10. A copy of the Scoping Report has been provided as an appendix to this Chapter (Appendix 2.1). The results of the scoping exercise undertaken have determined the subject areas of the EIA, set out in this ES Chapter.

Consultation

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

Table 2.1: Scope of Technical Stakeholder Consultation

Stakeholder Consultation
Manchester City Council Planning Authority
Manchester City Council Highways
Historic England
Greater Manchester Archaeological Advisory Service
Greater Manchester Police
Manchester City Council Environmental Health Officers
Places Matter! Design Review Panel
Environment Agency
Manchester Airport Safeguarding Team
Natural England
Transport for Greater Manchester
United Utilities

Public Consultation

- 2.12. A pre-application consultation exercise has been undertaken with local residents and businesses, in the form of an online public exhibition, which sought comments from members of the public for a three week period between January and February 2023.
- 2.13. An open webinar was also given for those members of the community who wished to know more about the proposals and to have the opportunity to be part of a questions and answers session with the project team.
- 2.14. Prior to the online exhibition, leaflets were delivered to a consultation zone, which included 3,140 properties in the vicinity of the Site and building managers were also sent the leaflet by email to maximise reach. This was confirmed as acceptable as a consultation zone with MCC Planning Officers.
- 2.15. A separate briefing pack was sent to Elected Ward Members inviting them to a separate briefing session ahead of the Public Exhibition. Several individual virtual Councillor briefing meetings with Deansgate and Hulme Ward Councillors took place on 18th, 20th and 24th January 2023.
- 2.16. A Statement of Consultation is provided in support of the application. It does not form part of the ES but should be read in conjunction with this Statement. It explains in more detail the feedback received and how that has been considered in the formalisation of the application submission proposals.

Non-Significant Effects

- 2.17. It is considered that the following disciplines will not give rise to likely significant effects on the environment and would therefore not require inclusion in the Environmental Statement. The chapters that are scoped out of this assessment are:
- Agricultural Circumstances
 - Aviation
 - Archaeology
 - Arboriculture
 - Ecology
 - Electronic Interference
 - Ground Conditions
 - Heritage
- 2.18. An explanation for why each discipline is not considered to give rise to likely environmental effects is provided in the EIA Scoping Report in Appendix 2.1 (ES Volume 2).

Approach to Technical Studies

- 2.19. 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.
- 2.20. 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. Pre-application engagement was also undertaken with Manchester City Council as the Local Planning and Highway Authority.
- 2.21. The technical studies have been undertaken in accordance with current best practice. Specific guidance used is referenced within each of the respective assessment chapters.
- 2.22. The majority of assessments involved consultations with statutory and non-statutory bodies, desk-based research, site inspections and surveys, impact prediction and mitigation.
- 2.22.1. The assessment and conclusions of the ES are based on the description of the Proposed Development provided in Chapter 4.

Structure of Technical Chapters

- 2.23. Each technical chapter of the ES (Chapters 6-15) has been set out broadly in line with Table 2.2.

Table 2.2: 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 & Significance Criteria	This section describes the method or approach employed in the assessment of impacts, the criteria against which the significance of effects has been evaluated, the sources of information used and any technical difficulties encountered. Relevant legislation is also identified.
Baseline Conditions	This section describes and evaluates the baseline environmental conditions i.e. the current situation and anticipated changes over time assuming the Site remains unchanged. This is a critical part of the EIA process as it provides a measure against which potential environmental effects can be assessed.
Identification and Evaluation of Key Impacts	This section identifies the likely significant effects on the environment resulting from the Proposed Development. A description of the likely effects of the Proposed Development and an assessment of their predicted significance is provided. The assessment of effect significance has been undertaken using appropriate national and international quality standards. Where no such standards exist, the judgments that underpin the attribution of significance are described. The guidelines, methods and techniques used in the process of determining significance of effects are contained within each of the technical chapters presented.
Mitigation Measures	One of the main aims of the EIA process is to develop suitable mitigation measures to avoid, reduce or compensate for any significant adverse effects of a project. 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, which is summarised in Chapter 16 of this EIA. 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.

2.24. Chapter 5 provides information to allow the construction phase of the Proposed Development to be assessed by the disciplines set out in Chapters 6-15.

Magnitude

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

Table 2.3: Methodology for Assessing Magnitude

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

Sensitivity

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

Table 2.4: Methodology for Assessing Sensitivity

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

Significance

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

Table 2.5: Methodology for Assessing Significance

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

- 2.28. 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'.
- 2.29. For the purposes of this Environmental Statement, an effect will be considered to be 'significant' if it is classed as either 'moderate' or 'major'. A neutral effect is occasionally used where there is a degree of impact but it is neither adverse or beneficial e.g. a new building within a selected viewpoint that neither contributes nor detracts from its surroundings.

Baseline Conditions

- 2.30. 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.
- 2.31. Given the complex nature of the EIA Site and surroundings, located in an urban area with multiple different land uses and interdependencies, each technical chapter (Chapters 6 to 15) includes a clear description of what is assumed as the baseline against which the assessment is being made.
- 2.32. 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

- 2.33. 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.

- 2.34. 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.
- 2.35. Mitigation recommended during the construction phase would be set out in the Construction Management Plan (CMP) to be secured via planning condition and approved by MCC prior to then being implemented throughout the duration of the works. Outline mitigation measures to be included in a future CMP are set out in Chapter 5: Construction Methodology and Programme.
- 2.36. Mitigation to be implemented during the operational phase would be secured through planning conditions and obligations.

Cumulative Effects

- 2.37. 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').
- 2.38. A search of MCC's planning applications database and knowledge of the area has identified a number of committed developments for which cumulative effects are considered more likely. A full list is contained at Appendix 2.2 and was provided to the Local Planning Authority as part of the Scoping Opinion process in an email dated the 14th March 2023.
- 2.39. Please note that following agreement with MCC of the committed developments that require assessment, it has come to our attention that , Plot 11 First Street has started on site and therefore it should technically be considered as a baseline scheme. As assessments had largely been completed at this time, the approach to retain Plot 11 in the cumulative scenario was followed by all technical consultants. However, for completeness, each consultant reviewed whether Plot 11 First Street being in the baseline assessment would make any difference to the conclusions of the EIA. This has been noted in each of the chapters as relevant.
- 2.40. To inform an accurate picture of the cumulative effects and timing of delivery of the Proposed Development in this context, each scheme was classified as under construction or a valid planning application.
- 2.41. Each technical chapter (Chapters 6-15) has assessed the potential for likely significant effects on the environment, as a result of the above committed developments, together with the Proposed Development.
- 2.42. In addition, Chapter 16 assesses the Type 1 Cumulative effects.

Residual Effects

- 2.43. The likely effects on the environment, assuming the successful implementation of mitigation measures proposed, have been estimated within each chapter. These are termed 'residual effects' and are considered in Chapter 17 of this Statement.

Assumptions and Limitations

- 2.44. 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 EIA 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 2022 from a variety of sources unless they have been deemed to be not representative of the baseline effects, 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 and, where appropriate, the constituent phases that would arise from the application as defined by the description of development set out in Chapter 4, EIA 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

- 2.45. 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.
- 2.46. The assessment has been explicit in recognising areas of limitation within the ES and any difficulties that have been encountered, including assumptions upon which the assessments are based. Where appropriate, the assessment of significance has been given confidence levels.

3. Alternatives and Design Evolution

- 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 Manchester City Council, 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 EIA Site.
 - Alternative design/layout for the Proposed Development in the context of the design evolution.

The “do nothing” Alternative

- 3.5. The “do nothing” scenario refers to the option of leaving the EIA Site in its current state. The EIA Site currently comprises a part cleared site, the Renaker Marketing Suite, the Manchester Carers Forum (Gaddum House), temporary site cabins associated with adjacent development, and a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete.
- 3.6. The principle of the EIA Site’s redevelopment to deliver a high density, residential led, mixed-use scheme is supported through Manchester City Council’s Great Jackson Street Development Framework (2018).
- 3.7. The EIA Site is considered suitable for high-density development given its highly accessible location within the City Centre and the Great Jackson Street Development Framework area. The EIA Site is considered suitable for residential use in terms of its urban location, close proximity to Manchester City Centre core with an array of transport links and connections, amenities, employment provision, social and recreational opportunities that the location facilitates for future residents.
- 3.8. The “do nothing” scenario would therefore result in the underutilisation of a City Centre brownfield site, located within a strategic regeneration area (Great Jackson Street Development Framework) that is seen as an important project in order to meeting housing supply. The regeneration strategy for this area acknowledges its huge economic potential and the need therefore to fully utilise finite land supply for appropriate uses through development that supports the City’s social, economic and environmental objectives.
- 3.9. The “do nothing” scenario has therefore been discounted due to the established need for the regeneration of the EIA Site and the benefits it will bring. Similarly, Manchester City Council’s own ambitious housing targets require areas of high density to meet identified need for new housing to support the city’s growth, with a 60,000-home delivery target between 2009 and 2027. At a sub-regional scale, the draft Places for Everyone Plan seeks to deliver up to 165,000 new homes across the 9 districts up until 2027.

Consideration of Alternative Locations

- 3.10. The EIA Site is located within the Great Jackson Street Development Framework (2018) area. The Framework was originally endorsed in 2007 and was updated in 2015 and 2018. Most recently, the Framework was updated to reflect the potential for further growth in this part of Manchester City Centre.
- 3.11. The EIA Site is situated at a key gateway into Manchester City Centre. The City Centre is expanding to the south towards the Inner Ring Road. This EIA Site, and the whole Great Jackson Street Development Framework area, was largely underutilised for many years until regeneration commenced in 2017 with the implementation of the development at Deansgate Square (now complete).
- 3.12. The proposed re-use of the EIA Site for residential use positively contributes towards the ongoing regeneration of Manchester and the expansion of the City Centre. Land is a finite resource in the City Centre and the Great Jackson Street Framework area is critical to meeting Manchester's targeted residential delivery and increase in the population of the City Centre.
- 3.13. The EIA Site is clearly in need of regeneration and provides the opportunity to directly contribute towards the identified need for housing in this part of the City Centre and, alongside other development plots under construction or committed within the Framework area, will support the creation of a new neighbourhood. The Proposed Development will deliver extensive and high quality area of public realm and will improve pedestrian and cycle connections. These will complement the valuable social infrastructure being delivered across the Framework, such as a single form entry primary school and public park being delivered as part of Crown Street Phase 2. The regeneration of the Framework area will bring vitality to the local area, diversify the local demographic and strengthen the local community by enhancing connections with existing nearby neighbourhoods.
- 3.14. Within this context, alternative locations have been discounted given the EIA Site's current underutilisation within the City Centre and being specifically identified by Manchester City Council as being suitable for high density residential development.

Consideration of Alternative Uses

- 3.15. The EIA Site's proposed use is for residential development. Other reasonable alternative uses, considering its City Centre location, have been discussed below:
- **Retail** – The EIA Site falls outside Manchester City Centre's Primary Shopping Area and a large-scale standalone retail development on this EIA Site would require extensive justification. The retail sector within the UK is currently volatile and there are a number of out of centre retail destinations in close proximity to the EIA Site, namely Regent's Road Retail Park in Salford. Delivering a retail development on the EIA Site has therefore been discounted.
 - **Hotel** – Renaker is a developer of high quality residential towers and has an excellent track record in this regard. Aligned to that, the Proposed Development will continue the establishment of a significant new residential led mixed use community within Manchester City Centre, in line with planning policy and an established development framework covering the Great Jackson Street area. . In addition, the EIA Site is located in close proximity to a number of established residential communities and the ambition for Great Jackson Street is to reinforce that residential nature. Therefore, given the EIA Site's context and location, a hotel development on the EIA Site has been discounted.
 - **Office** – A three storey office building is proposed, which is considered to be an appropriate scale for this area. The EIA Site does not form part of an existing commercial cluster, such as First Street or St John's framework areas nearby, nor Spinningfields or the Central Business District in Manchester City Centre. It would therefore be an untested market location for investors in commercial development or occupiers to bring forward more significant office space in the area.
- 3.16. For the reasons outlined above, alternative uses have been discounted. The principle of a residential development this location is consistent with planning policy and the Great Jackson Street Development Framework. The residential use will complement emerging development proposals in the area and will continue to support the wider regeneration of this part of Manchester City Centre.

Design Evolution

- 3.17. A wide range of specialist consultants and other stakeholders have provided valuable input into the evolving scheme which has served to inform the design process and assist the team in arriving at an appropriate solution.
- 3.18. The EIA Site's surrounding regeneration to date has been developed broadly in line the guidance set out in the Great Jackson Street Framework. This existing development and works still under construction, alongside the Great Jackson Street Framework has been considered throughout the design development and is reflected within the final design of the scheme being applied for. The EIA Site's position – adjacent to the to the south of Deansgate Square development, Crown Street Phase 2, Plot F and Plot G – has also informed the Proposed Development in terms of scale, density, quality and materiality.
- 3.19. The design concept seeks to respond to the opportunities and constraints established in the EIA Site's context analysis so as to contribute to the ongoing development and enhancement of the surrounding area.
- 3.20. A key consideration has been to refine the massing of the proposals to minimise the daylight and sunlight effects on existing and emerging residential receptors in and around the framework area, and to create variation in the skyline against these approved and delivered schemes within the Great Jackson Street area.
- 3.21. All design iterations were assessed by the design team from a number of differing aspects; from an aesthetic point of view, the need to mitigate against any environmental effects, and the need to create a high-quality scheme. Following initial testing of the scheme comments received from key stakeholders, the main aspects of the design testing and iteration are set out under the headings below.

Consideration of Alternative Scale and Massing

- 3.22. The design evolution of the Proposed Development has developed by responding to the EIA Site's setting adjacent to other high rise developments and its location within the Great Jackson Street Development Framework.
- 3.23. The Great Jackson Street Development Framework (2018) provides a guide for the EIA Site to deliver seven residential towers, up to 44 storeys.
- 3.24. Lower density development was not considered suitable for the currently underutilised EIA Site, as it would not maximise the regenerative benefits of a highly accessible, City Centre location. In line with MCC policy CC6, City Centre development will generally be high density to maximise its efficiency and reuse of brownfield sites.
- 3.25. The Proposed Development has carefully considered the principles contained within the Development Framework and the outcome of the design development process has resulted in the opportunity to deliver fewer towers than in the SRF, whilst increasing height to deliver the strategic objective for high density residential development.
- 3.26. The approach taken is consistent with that taken for earlier phases of the GJS Framework, as demonstrated by proposals at Crown Street Phase 2 and Plot F.
- 3.27. The revised approach is considered to be the most suitable design solution for the following reasons:
- Creating fewer towers will allow more light to penetrate into the Framework , increasing the level of daylight and sunlight able to reach lower levels and public realm spaces, than would be possible with more towers, due to the wider spacing between the towers.
 - The Proposed Development allows for an increase in usable public realm with the creation of a new public square as part of Crown Street Phase 3. In addition, it has enabled the design team to retain a number of existing mature trees, particularly at Plot D. Furthermore, there is a greater opportunity to introduce new trees, adding to the biodiversity and attractiveness of the area.
 - As a result of the greater separation distance between the towers, meaningful and high-quality public spaces and linkages can be provided to also support key connections between the City Centre and Hulme;
 - This building option maximises the face to face distances with both existing and proposed buildings. Distances exceeding 20m enables compliance with the Manchester Residential Quality Guidance, which is often very challenging within city centre locations; and
 - Building heights will relate better to the surrounding tall buildings such as Deansgate Square, Crown Street Phase 2 and Plot F. This prominent clustering signals southern gateway to the City Centre and thus it demands high quality buildings of scale to reflect this.

- 3.28. The five-tower option has been discussed in detail with the Local Planning Authority, as part of early pre-application discussions, and the approach was agreed in-principle. Further design reviews have taken place with local residents, Ward Councillors and expert design review panels to comment and allow for development of the design.
- 3.29. Notwithstanding the difference in form and scale, the proposals have been developed to directly respond to and align with the key components of the Framework and will make a positive contribution to the delivery of the Framework vision.
- 3.30. The Design and Access Statements submitted with the application sets out the options appraisal for the development which details how design of the Proposed Development has been formulated. The options considered for the development were considered within the context of the EIA Site and the final design is considered to respond most appropriately to the context.
- 3.31. On this basis, it is considered that alternative scale and massing has been considered and reasonably discounted. Alternative scenarios are provided in the Design and Access Statements submitted in support of each application.

4. EIA Site, Surroundings and Description of Proposals

Introduction

Introduction

- 4.1. This section of the ES provides a summary of the EIA Site and the Proposed Development to inform the basis for the technical chapters in the remainder of this ES. Full details of the EIA Site description and development proposals are provided within the Planning and Tall Building Statements and Design and Access Statements submitted with both Applications.

EIA Site Description

- 4.2. The two sites are defined by Figure 1.2.
- 4.3. The Crown Street Phase 3 application site currently comprises a cleared site to the east of Great Jackson Street, to the west of Great Jackson Street is the Renaker Marketing Suite, the Gaddum House and temporary cabins associated with development elsewhere in the Framework area.
- 4.4. Plot D comprises a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete.
- 4.5. An EIA Site Location Plan is provided at Appendix 1.

Site Specific Environmental Designations

Ecology

- 4.6. The EIA Site is not within, nor does it contain, any ecological designations including EIA Sites of specific scientific interest (SSSI), EIA Sites of biological importance (SBI) or special protection areas (SPA). The River Irwell Site of Biological Importance (SBI) lies 1.5 kilometres north-west of the EIA Site.
- 4.7. The EIA Site has some shrub vegetation and trees present along the site boundaries. None of these trees are subject to a Tree Preservation Order (TPO).

Heritage

- 4.8. The EIA Site is located circa 65m from Castlefield Conservation Area to the west and there are 34 listed buildings within 500m radius of the EIA Site as shown in Figure 4.1 below. There are no heritage assets on site.



Figure 4.1 Listed Buildings within approx. 500m of the surrounding areas of the EIA Site (Historic England Map, 2022).

Flood Risk and Drainage

- 4.9. The EIA Site has been identified as within Flood Zone 1 from Environment Agency mapping, indicating that the risk of flooding from rivers and sea is low.
- 4.10. The nearest watercourse to the development is the River Medlock and its confluence with the Bridgewater Canal which is located some 75m away from the EIA Site's eastern boundary.
- 4.11. The EIA Site is in excess of 0.5 hectares and is located within the Conurbation Core Critical Drainage Area. Therefore a Flood Risk Assessment is required and has been submitted as part of the planning application.



Figure 4.2 The EIA Site is within an area of Low Flood Risk (Source: Environment Agency)

Site Development Context

- 4.12. The EIA Site is in excess of 0.5 hectares and is located within the Conurbation Core Critical Drainage Area. Therefore a Flood Risk Assessment is required and has been submitted as part of the planning application.
- 4.13. The EIA Site forms Part of Plot C, E and D of the GJS Framework. The Development Framework was updated in both 2015 and 2018.
- 4.14. Most recently, the Framework was updated to reflect the potential for further growth in this part of Manchester City Centre.
- 4.15. Following public consultation organised by MCC, the 2018 Framework was endorsed by the Executive Committee in January 2018 and now forms a material consideration in the determination of any planning application within its boundary.
- 4.16. The vision for the Framework area has remained consistent since the 2015 endorsed version of the document; to 'create a vibrant, safe, secure and sustainable community'. The Framework establishes guiding development principles for the regeneration of Great Jackson Street to be characterised by high rise residential development.
- 4.17. Existing uses within the Framework area include light industrial units, offices, residential dwellings, and retail uses. A number of the key Framework plots have either been completed or are under construction to deliver new residential-led schemes. Full details of all cumulative developments are provided in Appendix 2.2 (Volume 2) of this Environmental Statement.
- 4.18. The EIA Site is located in a key strategic location to the south of the city centre. It is within a ten-minute walk of the Deansgate Transport Hub, providing access to the rail and tram network, and within walking distance of two key transportation hubs at Manchester Oxford Road Station and Piccadilly Station both of which offer local, regional, and national main line rail connections. Both stations also provide direct access to Manchester Airport.
- 4.19. The EIA Site is also within easy walking distance to employment opportunities and the services and facilities offered by Manchester City Centre and in close proximity to the district of Hulme, just beyond the Mancunian Way to the south. It benefits from being in close proximity to Oxford Road which is a bus corridor with many services linking Manchester City Centre, the Oxford Road Corridor, and South Manchester. It is also within easy access of the City's Inner Ring Road which connects with key arterial routes leading to the strategic motorway network.
- 4.20. The majority of uses to the east of the EIA Site are residential, comprising Deansgate Square towers, Boatman's, City South, Canvas Manchester, Lumiere and other apartment blocks. To the south, past the A57(M) is the established Hulme community predominantly comprising housing and community uses, as well as Hulme Park. The Hulme area is connected to the EIA Site area via Hulme footbridge, providing a significant link for pedestrians to and from the area. To the north, further residential developments are located including Elizabeth and Victoria Towers (developed under Crown St Phase 1) and beyond this, past the A56 Chester Road, is Castle Wharf and Castle Quay Apartments.
- 4.21. Several notable cultural attractions are within easy walking distance of the EIA Site, including the Palace Theatre, HOME, The Gay Village, and Chinatown. Furthermore, the EIA Site is well located in proximity to major commercial developments in Manchester City Centre, including First Street, Spinningfields and St Johns.

Proposed Development

- 4.22. The proposed EIA parameters of development is set out within Tables 4.1 and 4.2 below.

Table 4.1 Proposed uses, units and height for Crown Street Phase 3

Parameters for Development	
Site Area	1.286 hectares
Residential Apartments	1,746 apartments
Flexible Commercial Space	1,262.9 (GEA)
Maximum Height (AOD)	Approx. 151.8 m (C7 and C8) and approx. 140.4 m (E1 and E2)
Car Parking	483 spaces
Cycle Parking	1,746 spaces

Table 4.2 Proposed uses, units and height for Plot D

Parameters for Development	
Site Area	0.661 hectares
Residential Apartments	642 apartments
Restaurant Space	1,088 sq m

Office Space	2,059 sq m
Maximum Height (AOD)	Approx. 21.3 m (residential) and approx. 11.6 m (office)
Car Parking	214 spaces (residential) and 2 spaces (office)
Cycle Parking – Residential	642 long stay spaces
Cycle Parking - Restaurant	20 long stay spaces
Cycle Parking – Office	10 long stay spaces
Cycle Parking – Visitors	12 short stay spaces

Form, Mass and Scale of Crown Street Phase 3

- 4.23. The two towers to the west of the site are 51 storeys tall, 151.8m tall from ground level. The two to the east are 47 storeys and 140.4 m tall. The taller towers have a smaller building footprint. The facades have been developed to ensure the form of the buildings are reinforced; solid textured and clear reflective elements are used to emphasise the sawtooth plan form. The sawtooth along the north and south elevations articulates the longer building elevations and allows for views out of the building to be orientated away from the opposing tower. To create further contrast, solid aluminium panels with a solid backing to provide a sleek and reflect look as illustrated in the Design and Access Statement. Along the east and west elevations, the sawtooth creates a 'pinch' to the gables, to create a slenderer elevation to be presented back to the city.
- 4.24. A two storey pre-cast concrete podium is provided surrounding the central courtyard and this materiality is continued at the first and second floor levels around the podium, which seeks to provide a human scale to the proposals and to reflect the scale of the adjacent Bridgewater House and conservation area beyond Chester Road.
- 4.25. The public realm proposals for Crown Street Phase 3 seeks to act as a bridge between Deansgate Square (East) and Crown Street Phase 2 park (West). A central courtyard space is proposed that is akin to the size of Stevenson Square in the Northern Quarter.
- 4.26. A raised central lawn and single line of trees offers green amenity space, surrounded by the colonnade.
- 4.27. Seats are proposed at either side of the formal lawn. Commercial operators will also have zones where outdoor seating provision along the colonnade can be accommodated.
- 4.28. The Proposed Development seeks to narrow Great Jackson Street including a raised table and public realm street furniture.
- 4.29. The proposal incorporates 27 trees. Wind mitigation has been carefully incorporated into the landscape design strategy. The addition of street trees adds human scale to the streets and assists wind mitigation. The Landscape Design Statement provides images of the wind baffle planters that are also proposed to be located along Great Jackson Street.
- 4.30. Each tower incorporates a residents amenity space at level 2. The spaces are accessed via the residents lounge to each tower and provide private amenity for the residents. Each of the 4 terraces will include 6 trees and formal and informal seating areas.



Figure 4.3 Phase 3 Towers C7 and E2 South Elevation

Form, Mass and Scale of Plot D

- 4.31. The residential tower at Plot D is 71 storeys tall, with an actual height above ground level of 213m, a two storey podium block grounds the tower. To the east of the tower is a three-storey office building. The height of the podium and office block correlate to the height of the grounding elements of surrounding tall buildings around the EIA Site.
- 4.32. The podium and office buildings have a curvaceous form, particularly along Great Jackson Street to remain in keeping with the road layout. On top of the podium is the tower, a square footprint to contrast the free-form nature of the podium.
- 4.33. The material palette selected seeks to complement the emerging context of the Great Jackson Street Framework area, with a selection of glazing, metalwork and brick materials, similar to neighbouring developments but composed in an alternative fashion that will create a unique identity for the development with the upper floors featuring an illumination.
- 4.34. Public realm improvements are focussed along Melbourne Street and Great Jackson Street, located to the north western and north eastern elevations of the development. The streetscape forms part of wider transition route linking Hulme settlement into Manchester City Centre. The surface materials will tie in with the wider narrative along Great Jackson Street by incorporating high quality materials and a modern planting design.
- 4.35. The secondary public realm improvement areas are located to the service area points to the development and vehicle access to the basement level car parking.
- 4.36. A raised edge planter is proposed at the corner of Melbourne Street and Great Jackson Street that enables the retention of the existing trees whilst providing an opportunity for seating.
- 4.37. There are three roof terrace levels as part of the development. A communal terrace is located at first floor level of the residential tower at the western elevation. At second floor level, a visual amenity terrace is proposed which is accessed only for maintenance. The office block incorporates a roof terrace to the northern elevation at first floor level providing a useable space for staff members.
- 4.38. The first floor communal residents' amenity roof terrace is designed to create an open space that maximises the sunny aspect. A large open lawn is proposed, enclosed by trees with foliage, set within raised planters. Seating opportunities are incorporated within the design of the raised planters. The northern pocket of the terrace is framed by the planters and tree planting, whilst affording views through the glazed panels towards the adjacent Crown Street park.
- 4.39. At second floor level, the roof terrace forms a simple palette of materials that are low maintenance and provide an attractive visual setting for the residents. The terrace is for visual purposes only and is not intended to be accessed by residents.
- 4.40. The office block development incorporates a roof terrace space at level 1 along the northern elevation. The space provides seating and offers views along Great Jackson Street. The design will incorporate high quality surface materials along with large specimens/ small trees set within raised planters to create pocket spaces, soften the development edge and offer seasonal interest to the space.

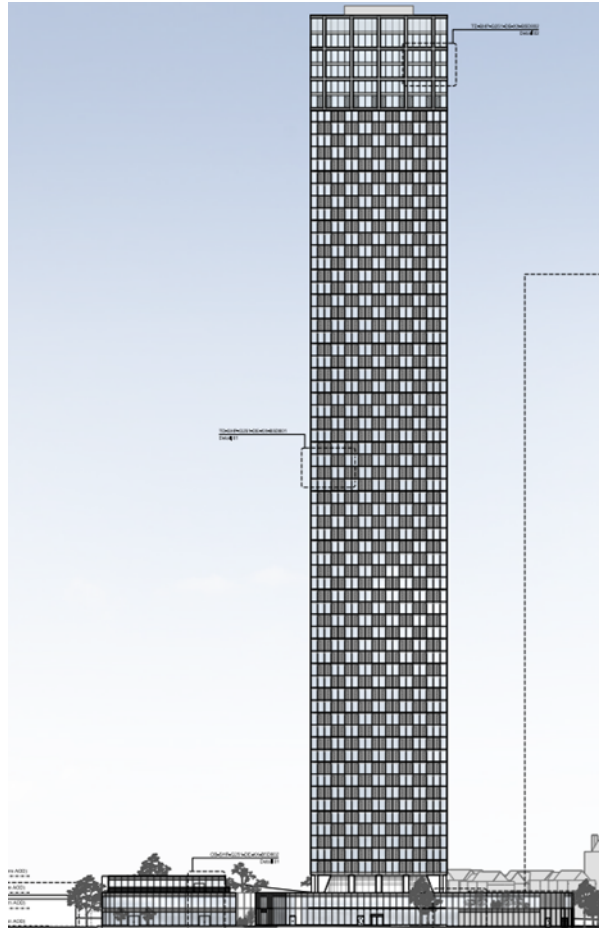


Figure 4.4 Plot D North Elevation

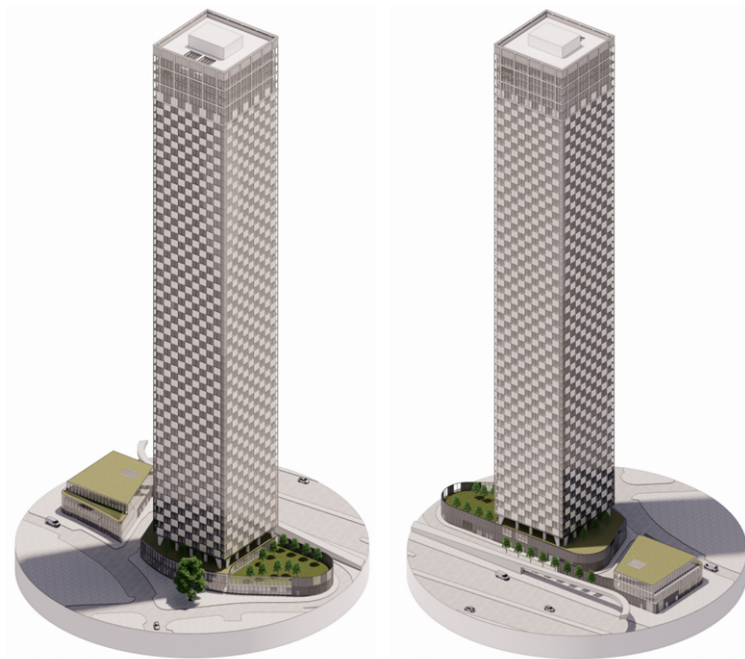


Figure 4.5 Plot D Proposed Form, Mass and Scale

Access and Highways for Crown Street Phase 3

- 4.41. The four towers are proposed to be built around a large central public square, which will be the main arrival space to the development.
- 4.42. The primary pedestrian route through the public realm is the connection between Deansgate Square and the proposed Crown Street Phase 2 park between the under crofts of the podium connecting the towers. Both a covered and an open routeway are proposed to create shade and shelter around the landscape.
- 4.43. The existing Site topography is relatively flat therefore the streets and spaces are fully accessible. The raised lawn has level access along the southern aspect of the lawn for a generous length of the lawn edge to allow ease of access for all and to assist with machinery accessing the lawn for maintenance.
- 4.44. There are two ample corridors proposed beneath the podium of the towers, linking the square to the east with Owen Street, and to the west with the proposed public park, multi-storey car park and cycle lane currently being built as part of CSP2. It is within these links, at the eastern and western ends of the square, that residential access to the four towers will be located. The retail units will have their pedestrian access points located in the vicinity of the square.
- 4.45. Cyclists would be able to access the EIA Site in a similar manner to vehicles, as the cycle stores are located within the underground car parks.
- 4.46. Each of the four towers will have its own vehicular access to the underground car parks.
- 4.47. Tower E2 basement car park will be accessed from the new extension to Melbourne Street, which also provides access to Plot F1. This section of the road will be two-way.
- 4.48. The road will continue to the north, linking the Site and Owen Street. However, access will be limited to servicing vehicles and to be controlled via droppable bollards or a similar access control mechanism.
- 4.49. Tower E1 basement car park will be accessed off Owen Street. A short section of Owen Street will be reduced to a single lane, to be priority controlled and with southbound vehicles to have priority.
- 4.50. Tower C8 will have access to its basement car park located off Silvercroft Street.
- 4.51. Tower C7 will have access to its basement car park located off Melbourne Street, which will become one-way northbound as part of the Proposed Development.
- 4.52. Access for taxis and private vehicles dropping off residents of the development is described below in Section 3.6.
- 4.53. Owen Street and the extension to Melbourne Street as part of the Proposed Development will not be offered for adoption and will remain private. Barriers will control access to the car parks, with other access control measures (via droppable bollards or similar) to the different plots. These will also act as traffic calming measures, reducing vehicular speeds along the Site access roads.
- 4.54. Drawing 081453-CUR-XX-00-D-TP-75002 shows the proposed access arrangements, with Drawing 081453-CUR-XX-00-D-TP-05008 showing the swept path analysis of a large refuse vehicle negotiating the CSP3 Site access roads.
- 4.55. Drawing 081453-CUR-XX-00-D-TP-05010 illustrates the swept path assessment of a large car accessing the car park for the CSP3 Site.

Access and Highways for Plot D

- 4.56. Pedestrians will access the proposed residential tower from the corner between Great Jackson Street and Melbourne Street. The restaurant at Level 70 will have an independent access to a lift, located at ground floor off Great Jackson Street. The office building will also have its pedestrian access located off Great Jackson Street.
- 4.57. The Crown Street Phase 2 proposals (currently under construction) include a 3m wide footway/cycleway, linking Melbourne Street and the existing cycle lane along Chester Road. A new signalised Toucan crossing is proposed on Melbourne Street as part of the Proposed Development at the Plot D Site, connecting footway/cycleway provision within the Plot D Site to the footway/cycleway proposed as part of Crown Street Phase 2. This is intended as the primary access route to the Plot D Site by cyclists, and will be complemented by a 3m shared space for pedestrians and cyclists along the southern side of Melbourne Street.
- 4.58. The main cycle store at the residential tower will be located at ground floor, conveniently located at the southwestern corner of the podium and in the vicinity of the proposed Toucan crossing across Melbourne Street. There will be a number of additional cycle stores at the basement levels. Cyclists will access these stores in a similar manner to vehicles.
- 4.59. Access to the office building cycle store will be via the proposed path to the bridge over the Mancunian Way, to the east of the Proposed Development. The landing point of the Hulme bridge has been considered and levels examined to ensure that connectivity is not impeded. Dedicated crossing points will be provided for pedestrians and a cycle link between this area and Crown Street Phase 3.
- 4.60. Plot D basement car park will be accessed off a new access road, creating a loop surrounding the residential tower. The access road will be one-way and be accessed off Great Jackson Street, with the egress point joining Melbourne Street, becoming a northbound lane. On this basis, Melbourne Street will become a one-way, two-lane road.
- 4.61. Located between Crown Street Phase 2, Crown Street Phase 3 and Plot D is the proposal to create a controlled crossing connecting to the shared pedestrian cycle link. This will be a signalised junction.
- 4.62. A dedicated loading bay will be provided at the rear of the development for servicing, including refuse vehicles, large scale goods deliveries and removals.
- 4.63. A taxi drop off for the tower is located on the southern side of Great Jackson Street, adjacent to the concierge and restaurant entrances.
- 4.64. Drawing 081453-CUR-XX-00-D-TP-75001 shows the proposed access arrangements, with Drawing 081453-CUR-XX-00-D-TP-05001 showing the swept path analysis of a large refuse vehicle negotiating the Plot D Site access roads.
- 4.65. Drawing 081453-CUR-XX-00-D-TP-05009 illustrates the swept path assessment of a large car accessing the car park for the Plot D Site.

Construction Programme

- 4.66. The Applicant has provided an indicative construction programme in Section 5 and Appendix 5.1 for delivering the proposals. This assumes the Applicant obtains planning permission during Q3 2023 and the first residential tower Plot E2 to be operational in Q1 2028.
- 4.67. The Construction Methodology is set out in full within Chapter 5 of this ES. It notes that this programme may ultimately be extended in the event delays caused by sustained periods of poor weather, unexpected ground conditions or other abnormals, volatility in economic and housing markets, political uncertainty, and the availability of funding.

5. Construction Management and Phasing

Introduction

- 5.1. This Chapter of the ES describes the proposed construction programme and key activities that will be undertaken. Detailed consideration of potential impacts during the construction process and any necessary mitigation measures are provided in each relevant chapter of the ES.
- 5.2. The main aim throughout the construction period is to regulate and diminish the impact on the surrounding properties and roadways for the duration of the work. Close collaboration with the highways department and other construction project management teams from nearby sites will be promoted by the Applicant to achieve this aim.
- 5.3. The following narrative explains this methodology and timescales envisaged at the time of the planning application. More detailed proposals will be developed once contractors are appointed and prior to commencement on site. This will include preparation of detailed plans to incorporate Construction Management, Construction Phase Health and Safety, Environmental Management as well as Site Waste Management, Logistics and Traffic Management.

Programme

- 5.4. See Appendix 5.1.
- 5.5. Key programme dates are provided below. In summary, the building period is scheduled to be eight years in total from starting on site.
- Plot E2: Start works in Q3 2024 and finish in Q1 2028. Total time = 3.5 years build.
 - Plot D Office: Start works in Q1 2026 and finish in Q3 2027 (First Phase Complete). Total time = 18 months.
 - Plot E1: Start works in Q3 2025 and finish in Q1 2029. Total time = 3.5 years build.
 - Plot C8: Start works in Q3 2026 and finish in Q1 2030. Total time = 3.5 years build.
 - Plot C7: Start works in Q3 2027 and finish in Q1 2031. Total time = 3.5 years build.
 - Plot D Tower: Start works in Q3 2027 and finish in Q3 2032. Total time = 4.5 years build.

Plot D Tower: Start works in Q3 2027 and finish in Q3 2032. Total time = 5 years build.

Phasing and Logistics

- 5.6. See Appendix 5.2.
- 5.7. The build sequence is split into 6 phases setting out the most likely phasing sequence. The first phase is due to be the office building, however, the Applicant requires flexibility regarding the delivery of Phase 1. All consultants have therefore considered whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. In this respect, Phase 1 is being considered as a 'floating' phase, which could be delivered at any stage in the above sequence.
- 5.8. This will be followed by the construction of building E2 which is located adjacent to the already consented Plot F scheme, Plot F will be well advanced at this point in time.
- 5.9. The basement of E2 & E1 will be constructed at the same time with E2 tower construction following on, approximately 1 year later E1 tower will start.
- 5.10. C8 and C7 will follow the same principle.
- 5.11. The Plot D residential tower will be the final tower.
- 5.12. The proposals are based upon normal working hours in line with MCC Guidance of 08:00hrs – 1800hrs Monday to Friday and 0800hrs to 1400hrs on Saturdays.
- 5.13. On Sundays and Bank holidays noisy working will generally not be planned. On some occasions there are certain operations that maybe required to proceed during these periods, for example tower crane erection and dismantling. These will be infrequent and will be agreed with the Environmental Health Officer (EHO) and local residents through a series of neighbourly engagements. The frequency of these will vary and respond to demand. Access to the EIA Site will be permitted 30 minutes prior to working day commencing with noise being kept to a minimum for the first half hour of each day.

Construction Methodology

- 5.14. The following is a brief overview of the methodology to be adopted for the construction and fit out of the Proposed Development. The section also considers general logistics as well as traffic management for the movement of material to the disposal of waste.
- 5.15. The whole EIA Site has not yet been cleared and some demolition will be required i.e. Gaddum House still remains. The EIA Site also currently operates as a batching plant, a marketing suite for Renaker sales and a surface car park. Initially during the archaeological investigation, a 'Heras' open mesh hoarding will be erected. This will be followed by solid hoarding surrounding each plot as it comes forward and any associated space required for construction logistics, prior to the start of the construction works proper. Given the phased nature of the scheme, the exact location of this hoarding will differ from phase to phase, and access to Great Jackson Street will remain open.
- 5.16. The site welfare space will be located on phase 4/5 plots until phases 1,2 & 3 are complete. This is a short distance from all of the sites. Phase 6 will occupy the bottom two floors of the previously constructed Phase 1 office block. The welfare facilities will be suitably sized to suit the anticipated number of operatives and fitted out with the correct facilities.
- 5.17. Any temporary public road or footpath closures associated with the construction phase will be agreed with MCC highways department and relevant diversion signage put in place.
- 5.18. Access to the EIA Site entrances will be controlled by biometric scanner through a secure metal turnstile. This will monitor our operative's movements and prevent unauthorised public access to the EIA Site. The main gates will be locked secured at all times with the exception of when a delivery is being made. The gates will be manned by qualified banksmen who will co-ordinate traffic, bank deliveries as well as ensure the road and pavement areas are kept clean.
- 5.19. Where required, appropriate wheel and vehicle wash facilities will be in place to ensure delivery wagons leave site clean and tidy with regular cleaning of nearby surrounding streets as appropriate using road sweepers.
- 5.20. Any loading and unloading of material deliveries will occur within the EIA Site boundary unless exceptional circumstances require special measures to be instigated.
- 5.21. Waste materials will be placed in skips and these will be removed on a regular basis. Food waste from canteens and eating areas will be contained within a smaller covered skip as recommended by EH guidelines.
- 5.22. The EIA Site will employ security guards as appropriate to prevent and discourage nuisance. Regular patrols will take place throughout the shift. As an additional measure, CCTV will be installed to elements of the EIA Site and compound to aid early identification of potential issues.

Construction

- 5.23. The works generally comprise of the following:
- Creation of piling mat substrate and formation of tower crane bases.
 - CFA & bored piling to the EIA Site perimeter with associated temporary propping.
 - Bulk excavation.
 - Bearing pad construction, ring beams and basement car park slab and drainage.
 - Installation of tower crane(s).
 - Construction of in-situ concrete frame, concrete stair cores and floors to roof level by concrete pump and jump form construction.
 - Roof coverings.
 - Installation of unitised facades and brick facades including windows and MVHR grilles.
 - Installation of internal mechanical and electrical systems including main lifts.
 - Fit out of apartments including walls, floors, ceilings, bathrooms kitchens and final finishes.
 - Removal of tower crane.
 - Completion of internal finishes to communal space.
 - Completion of communal external space and links.
 - Removal of permanent hoardings and temporary gates.
 - Completion of public realm, and S.278 works.
 - Decant from site and full opening of the development.

Infrastructure

- 5.24. The Phase 1 -6 works generally comprise of the following:
- Drainage connection to main foul drain on Great Jackson Street.
 - Rainwater drainage, via approved attenuation system into the combined sewer on GJS.
 - Electrical connection with 2 new indoor substations off GJS.
 - Mains water connection to main situated on GJS.
 - Telecoms and data infrastructure connections from GJS

Traffic Management Plan

- 5.25. The EIA Site is served well from perimeter roads to the north and south via Chester Road and the Mancunian Way. Deliveries will traverse from these arteries to each EIA Site entrance via the wide Great Jackson Street roadway.
- 5.26. This approach negates the need for traffic to access via the city centre. A full traffic management plan will be developed with permission of MCC to include:
- Integration of traffic management scheme with surrounding construction developments and calming measures.
 - Access, egress, drop off and turning areas.
 - Temporary and/or permanent alterations to local traffic routes (both vehicular and pedestrian).
 - Additions, alterations and positions of any temporary signage, road markings or protection barriers.
 - Pedestrian access around site and relevant protection, lighting and signage schemes.
 - Temporary suspension / relocation of any parking bays.
 - Segregation of plant, materials and pedestrians on site and safe access routes between welfare and site areas.
 - The provision of car parking, off and on site, and public transport strategy for staff and operatives
 - Loading bays, hoist positions and tower crane areas.

- Any other measures to ensure the safe integration of pedestrians, cyclists and road users both on, off and surrounding the development.
- The Renaker Build Protocol of timed and booked deliveries and off peak deliveries will be incorporated into the traffic management plan.

Deliveries

- 5.27. Delivery routes for the major materials and items of plant will be as per the section above and we will endeavour to deliver outside of peak traffic hours to diminish local disruption and the normal workings of the surrounding properties.

Parking

- 5.28. There will be a limited number of visitor and key staff parking within the EIA Site and office area. Additional parking will also be available on the surrounding public car parks, the closest of which are owned and operated by the developer. Site personnel will be encouraged to utilise the extensive public transport options available to them.

Health and Safety

- 5.29. The project will be carried out in accordance with the Construction, (Design and Management) Regulations 2015, and all other relevant legislation and guidance.
- 5.30. Renaker Build Limited will be Principal Contractor. Renaker Build Limited can demonstrate competency in the management and execution of Health and Safety. Renaker Build Ltd have the appropriately trained management resource and procedures in place to oversee the activities of a complex, high rise city centre construction project.
- 5.31. As demonstrated by the appointment prior to the planning application, the Principal Contractor will work closely with the Principal Designer at this early stage of the project and will influence the detailed design to remove construction and residual safety risks.
- 5.32. The Principal Contractor will produce a Construction Phase Health and Safety Plan prior to works commencing on site that will be reviewed and signed off by the client and their Principal Designer. This document will form the basis of the procedure for managing health and safety during the construction phase and will be periodically reviewed as the work progresses.

Construction Materials

- 5.33. There have been no materials at this stage of the design process which are considered to generate a risk to construction personnel which will be unfamiliar to an experienced contractor. The hazards arising from the use of wet cement, epoxy resins and solvent based paints can be expected and appropriate measures to minimise any risk will be a requirement of the main contractor.

Site Security and Safety

- 5.34. Protecting the public from risks to their health and safety arising from the construction work is a high priority. Every care will be exercised to prevent risk to members of the public and appropriate action, including the erection of perimeter fencing to a specified standard, will be taken.
- 5.35. Vandalism and theft of plant, equipment, materials and fuel is possible throughout the duration of the development. Renaker Build Ltd will take appropriate action, as described in previous sections, to ensure the site is secure at all times from unauthorised access. As described previously, the site will have metal turnstile access system controlled by a biometric access control system.
- 5.36. The provision of CCTV and/or a Static Guard would be considered if required assist in the prevention of unauthorised access and activities.

Environmental Management

- 5.37. An Environmental Plan, in line with the Renaker Build Ltd environmental management system, will be developed to address and monitor the following issues:
- Applicable environmental legislation.
 - Pollution.
 - Nuisance (Noise, vibration, dust, emission and light).
 - Public relations.

Environmental Legislation

- 5.38. Applicable environmental legislation will be identified in a register, to ensure that appropriate systems are put in place in order to comply with the legal requirements in question.

Pollution

- 5.39. Renaker Build Ltd working closely with GeoAssist will establish procedures to ensure the prevention of water and ground pollution, relating to the following risk activities:
- The ground investigation report establishes the water table at a level that will not require full scale dewatering of the site. This will be carried out by local pumping with settlement tanks to an agreed discharge point with United Utilities.
 - Soil contamination remediation.
 - Earthworks (including piling, spoil movement and removal, and movement of contaminated soils).
 - Concrete works (including washing out of concrete delivery vehicles and pumps).
 - Storage and movement of fuels, oils, chemicals and other such fluids.
 - Cleaning (including plant, machinery and wheel washing).

Nuisance (Noise, Vibration & Dust)

Noise & Vibration

- 5.40. The principle concerns relating to the nuisances of noise and vibration come from construction activities such as demolition, excavation, cutting, breaking out and plant movements. Mitigation measures will be considered to include low noise options, noise attenuation techniques and carrying out certain activities during agreed hours of the day.
- 5.41. In order to regulate the noise, Renaker Build Ltd will provide the following:
- Any compressors brought on to the EIA Site to be silenced or sound reduced models fitted with acoustic enclosures.
 - All pneumatic tools to be fitted with silencers or mufflers where available.
 - Care to be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities to be instructed on the importance of handling the scaffolds to reduce noise to a minimum.
 - The majority of deliveries to be programmed to arrive during normal working hours only. Care to be taken when unloading vehicles to regulate noise. Delivery vehicles to be routed so as to reduce disturbance to local residents. Delivery vehicles to be prohibited from waiting within or in the vicinity of the EIA Site with their engines running.
 - All plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise.
 - Where possible, all plant to be sited so that the noise impact at nearby noise sensitive properties is regulated.
 - Local hoarding, screens or barriers to be erected as necessary to shield particularly noisy activities and
 - Problems concerning noise from construction works can often be avoided by taking a considerate and neighbourly approach to relations with the local residents. Where possible, works should only take place during given periods, e.g. during normal construction hours and not at night.
- 5.42. In order to regulate the vibration, Renaker Build Ltd will provide the following:
- Adoption of low vibration working methods. Consideration should be given to use of the most suitable plant.
 - Where processes could potentially give rise to significant levels of vibration, on – site vibration levels should be monitored regularly by a suitably qualified person.
 - Where piling is to take place, any obstructions should first be removed.
 - The provision of cut-off trenches in order to interrupt the direct transmission path of vibrations; and,
 - Application of piling techniques aimed at reducing resistance to penetration e.g. pre-boring for driven piles and adding water to the hole for impact bored piles.

Dust

- 5.43. The principal concerns relating to air quality and emissions from construction activities are in the form of dust and fumes. The degree of dust deposition is usually dependant on the nature of the works. Increased levels of dust are most likely to occur during site activities related to demolition (of which there are some that will be required) piling, moving construction traffic and ground works.
- 5.44. In order to regulate the dust and fumes, Renaker Build will provide the following;
- Providing a hard surface where vehicle movements occur.
 - Control measures and dust suppression techniques.
 - Minimising stock piling and positioning in a manner that reduces risk of dust arising through wind action.
 - Measures such as screening and covering.
 - Installation of appropriate wheel and body wash facilities.
 - Keeping of adjacent roads and pavements clean.
 - Ensure plant is turned off and not left running when not in use.
 - Selection of electrically powered plant where possible in lieu of diesel or petrol plant.

Public Relations

- 5.45. The contractor will ensure that regular contact is made with local residents and community groups to ensure they are kept up to date with general progress on the site. This is especially important for major work elements such as piling and tower crane erection due to our close proximity to adjacent residential schemes. Renaker Build Ltd will display a contact number on hoardings which will be answered 24/7.

Waste Management Strategy

- 5.46. In line with the "Site Waste Management Plan Regulations 2008", a Site Waste Management Plan (SWMP) will be developed by the principal contractor and agreed with MCC.

Operational Waste Removal

- 5.47. Waste generated during the construction phase is to be cleared on a daily basis to a main holding skip. Each floor plate will have a designated waste area that will see bins located within it that can be emptied at the end of each shift. During high waste activities, such as dry lining, this waste removal may need to occur several times a day via the hoists and as such general operatives will be employed to ensure this will occur. Hazardous waste will be stored and disposed of separately but main waste will enter a common skip where our supplier will sort at their transfer station before issuing us recycling percentages and data.
- 5.48. To reduce the volume of waste sent to landfill, waste from site will be segregated at the waste transfer station into the following categories.
- CAT A: Hazardous waste – Paint tins, mastic etc
 - CAT B: Metal
 - CAT C: Timber

Summary

- 5.49. The Construction (Design and Management) Regulations 2015 will apply to this project and all appropriate controls and systems will be in place to comply with the standards of the Regulations and associated guidance.
- 5.50. Every stage of the project will be pre risk assessed and appropriate controls applied, sub-contractors will be pre vetted and will be subject to extensive pre contract requirements of information transfer and risk assessment.
- 5.51. A fundamental aspect of the Principal Contractor's role is the development of a Construction Management Plan, which will take account of all known risks, which have been identified at pre-construction stage by the Principal Designer/CDM Consultant, the Design Team and also through site investigations.
- 5.52. The Construction Management Plan will describe arrangements and procedures for managing these key risk areas in more detail, as well as any future risk, and also the resources, including personnel, which will be applied to the scheme and which will ensure the Health and Safety of all those working on or affected by the project works.
- 5.53. Renaker Build Limited will have an on-going process of monitoring health and safety standards throughout its organisation. This is normally done directly (on site) by the site management team through regular inspections, toolbox talks etc. and also via the risk assessment process both during the completion of risk assessments and then by monitoring the effectiveness of risk control measures, which have been implemented. Site managers will also undertake regular reviews of safety on site, including any accidents or incidents and any matters raised will be dealt with accordingly.
- 5.54. Health and safety is also incorporated as a fundamental aspect of the overall project review, the Applicant has appointed Renaker Build Limited as Principal Contractor, Renaker Build Limited can demonstrate competency in the management and execution of Health and Safety. The Principal Contractor will work closely with the Principal Designer at this early stage of the project and will influence the detailed design to remove construction and residual safety risks.
- 5.55. The Main Contractor will at the earliest possible stage of the project enter into dialogue with all relevant parties, including neighbours to ensure there is effective coordination throughout all stages of construction.

6. Air Quality

Introduction

- 6.1. This chapter of the ES was prepared by Enzygo Limited and assesses the air quality impacts of the Proposed Development upon the surrounding area and across the EIA Site. This chapter also describes the methodology applied to assess these impacts, the existing baseline conditions, the recommended mitigation measures required to prevent, reduce, or offset any significant impacts and the predicted residual impacts after measures have been implemented.
- 6.2. This Chapter is accompanied by six technical appendices, which include:
- Appendix 6.1 - Figures
 - Appendix 6.2 - Road Traffic Impact Assessment Inputs
 - Appendix 6.3 - Construction Phase Dust Risk Assessment Methodology
 - Appendix 6.4 - Construction Phase Road Traffic Impact Assessment
 - Appendix 6.5 - Operational Phase Road Traffic Impact Sensitivity Analysis
 - Appendix 6.6 - EIA Qualifications
- 6.3. This chapter presents a summary of the information included within the technical appendices which have been structured to address potential air quality impacts associated with:
- Fugitive dust emission impacts; and
 - Road traffic exhaust emission impacts.
- 6.4. The authors of the chapter are suitably qualified air quality practitioners with many years' experience preparing air quality assessments for EIA developments. They include membership of the Institute for Air Quality Management and Institute of Environmental Science and have experience working on varied projects across the UK within the industrial and residential sectors, preparing assessments for planning and permitting applications. A summary of their project experience is detailed in Appendix 6.6

Assumptions and Limitations

- 6.5. A number of assumptions were made during the preparation of the Chapter as a result of potential uncertainty in input data and the choice of modelling parameters. These include:
- Baseline data – it is assumed that data produced by the DEFRA, Manchester City Council (MCC) and Salford City Council (SCC) provide accurate representations of baseline conditions and is quality assured.
 - Meteorological data - Modelling was undertaken using 2019 hourly average meteorological data from Manchester Airport. This station is considered the most representative to reflect local meteorology across the modelling extents. Data was obtained from an established distributor of meteorological data within the UK and assumed to be accurate;
 - Construction phase - inputs for the risk assessment were based on professional judgment and applies a worst case approach, including assumptions on soil types, receptor classifications and construction volumes;
 - Traffic flow data – it is assumed the data provided by the appointed transport consultant, Curtins, is accurate; as it has been agreed and scoped with the relevant Highways department. Flows were provided on 13th of January and were subsequently updated on 22nd March following a minor amendment to the office floorspace. The amendment has slightly reduced traffic flows and therefore the preliminary data utilised within the Chapter represents a worst case scenario reflecting maximum traffic flows. Therefore, amendments to the traffic flow data have not affected the Chapter conclusions. Data obtained from the Department for Transport (DfT) is also considered appropriate.
- Operational phase receptor locations - locations were modelled adjacent to the affected traffic network at worst case areas at to signalled road junctions and known congestion sections.
- 6.6. A number of air quality factors are likely to change in future years and therefore act as limitations to the assessment, these include:

- Road traffic exhaust emissions - the Department for Environment, Food, and Rural Affairs (DEFRA) predicts these are to decrease in future years with changes to the UK's vehicle fleet reflecting government legislation and policy. However, an assumption that air quality conditions would not improve in line with current predictions have been applied throughout the Chapter and therefore represents a robust approach.
- Background pollutant concentrations are also predicted to improve in the future. Background concentrations used within the Chapter correspond with emission factor profiles and traffic scenarios for completeness. For example 2024 traffic data and emission factors will be accompanied by 2024 background concentrations.

6.7. Modelling was carried in accordance with the guidance set out in Local Air Quality Management Technical Guidance 2022 (LAQM.TG22), which is the industry standard approach and provides a standardised approach for the air quality modelling process and reduces uncertainty in modelling predictions.

Legislative and Policy Context, Guidance

Legislation

The Air Quality Standards Regulations 2010

- 6.8. Part IV of the Environment Act (1995), the Secretary of State to publish a national Air Quality Strategy (AQS). The AQS produced by DEFRA sets out the framework to reducing adverse impacts of air pollution upon human health, vegetation, and ecosystems. To achieve this the AQS defines Air Quality Objectives (AQOs) for 10 key pollutant species, including nitrogen dioxide (NO₂), fine particulate matter (PM₁₀ and PM_{2.5}) which are relevant to this Chapter. European Directive 2008/50/EC also sets out a similar approach to the AQS and defines limit values for the protection of human health and ecosystems.
- 6.9. The regulations also state that exceedances of the AQOs should be assessed in relation to air quality at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present. The AQOs which are applicable to this Chapter are summarised in Table 6.1 with relation to human health receptors.

Table 6.1 - Air Quality Objectives

Pollutant	Air Quality Objectives Concentration (µg/m ³)	Averaging Periods
NO ₂	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
Particulate matter with an aerodynamic diameter of less than 10µm (PM ₁₀)	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
PM _{2.5}	25	Annual mean

- 6.10. PM₁₀ includes all particulate matter with an aerodynamic diameter less than 10 µm in diameter, and therefore PM_{2.5} comprises a proportion of the total PM₁₀ concentrations. However, a separate objective is defined for PM_{2.5} as it poses a greater risk to human health, hence the more stringent objective.

- 6.11. LAQM.TG22 specifies locations where the AQOs should be applied as detailed in Table 6.2.

Table 6.2 - Where Air Quality Objectives Apply

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

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
1-hour mean	As above, and kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

- 6.12. Local Authorities (LAs) also have an obligation to periodically review and assess air quality within their administration to determine if specified pollutants are exceeding relevant AQOs. This review involves the assessment of present and likely future air quality and is termed Local Air Quality Management (LAQM).
- 6.13. Should the LAQM process identify areas which are predicted to or currently exceed relevant AQOs the LA is required to designate an Air Quality Management Area (AQMA). The AQMA is then accompanied by an Air Quality Action Plan (AQAP) which sets various measures and policies to improve air quality with the goal of restoring compliance with the AQOs. The process of LAQM is informed by LAQM.TG22.

National Planning Policy

- 6.14. The National Planning Policy Framework (NPPF), revised on the 20th July 2021, sets out the Government's core policies and principles with respect to land use planning, including air quality. The document focuses upon the protection of the natural and local environment by preventing both new and existing development from contributing to or being put at adverse risk from unacceptable levels of air pollution. It stresses the importance sustainability and achieving compliance with relevant limit values or national objectives for pollutants, as well as the implementation of effective mitigation to offset development generated impacts.
- 6.15. Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:
- “Planning policies and decisions should contribute to and enhance the natural and local environment by:
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality”.
- 6.16. The NPPF recognises air quality as part of delivering sustainable development and states in paragraph 186 that:
- “Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”
- 6.17. The implications of the July 2021 NPPF have been considered throughout this assessment.

Local Planning Policy

The Manchester Local Plan

- 6.18. The Manchester Local Plan comprises a number of documents which set out MCC's spatial policy framework, of which the Core Strategy is the key document. The Core Strategy was formally adopted in 2012 and provides a framework for development within the city up until 2027. A review of the Core Strategy identified the following policies related air quality:
- Policy DM1: Development Management
- All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

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

- Policy EN16: Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within AQMAs, 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 AQMAs.

- Policy T1: Sustainable Transport

To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the Council will support proposals that:

Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties.

- 6.19. Reference was made to these policies during the undertaking of the Chapter by assessing effects on amenity and the impacts of construction dust and road vehicle exhaust emissions on nearby existing sensitive locations within the Greater Manchester Authority AQMA.
- 6.20. Measures to minimise and mitigate the impact of emissions from traffic generated by the Proposed Development have also been considered.

Greater Manchester Air Quality Action Plan

- 6.21. The primary objectives of the Greater Manchester Air Quality Action Plan (AQAP) are to improve air quality across Greater Manchester and to embed low-emission behaviours into the culture of our organisations and lifestyles by 2025, whilst supporting the UK Government in meeting all EU thresholds for key air pollutants. The Plan identifies 'Key Priority Areas' which are generally locations near to major roads and heavily trafficked areas in Manchester City Centre, and other major urban centres across the other nine districts.
- 6.22. The AQAP comprises a single document including actions that will be ratified by Transport for Greater Manchester (TfGM) and district authorities to tackle air quality in Key Priority Areas. The AQAP was acknowledged during the preparation of this Chapter.

Guidance

- 6.23. Industry standard guidance was used to inform the methodology of each assessment stage. This includes guidance developed by the Institute of Air Quality Management (IAQM), among others:
- Guidance on the Assessment of Dust from Demolition and Construction - IAQM;
 - Land-use Planning & Development Control: Planning for Air Quality - EPUK & IAQM; and
 - Local Air Quality Management Technical Guidance - DEFRA.

Assessment Methodology and Significance Criteria

- 6.24. Emissions generated by the Proposed Development during construction and operation have potential to cause impacts at existing sensitive receptors locations. Road traffic emissions associated with the adjacent road network could also exposure future residents to areas exceeding the national AQOs detailed in Table 6.1. These matters have been assessed in accordance with the following methodology, which comprises of the following assessment stages:
- Construction Phase Fugitive Dust Impact Assessment,
 - Construction Phase Road Traffic Impact Assessment,
 - Operational Phase Exposure Assessment; and
 - Operational Phase Road Traffic Impact Assessment.

- 6.25. The following sections set out the industry standard assessment methodologies and appropriate impact significance criteria.

Construction Phase – Off site Fugitive Dust Risk Assessment

- 6.26. There is potential for fugitive dust impacts to occur at sensitive locations as a result of activities during the construction phase. This could include dust emissions generated during demolition, the import and export of earth, the storage and processing of materials, trackout from vehicle movements among many other potential emission sources. A qualitative assessment was undertaken in accordance with the IAQM methodology to determine impact significance and recommend best practice control measures to reduce associated impacts.
- 6.27. Construction activities are divided into four areas to reflect their potential impacts. These are:
- Demolition
 - Earthworks;
 - Construction; and
 - Trackout.
- 6.28. To determine the significance of potential dust emission impacts each construction phase activity was evaluated against three separate dust effects:
- Annoyance due to dust soiling;
 - Harm to ecological receptors; and
 - The risk of health effects due to a significant increase in exposure to PM₁₀.
- 6.29. A desk top survey was undertaken to identify human and ecological receptors within the relevant assessment buffers specified by the IAQM guidance. Following the identification of sensitive receptors, a site is then allocated a risk category which is assigned to each activity, based on the scale and nature of the works, as well as the sensitivity of the area to dust impacts.
- 6.30. The assigned magnitude and sensitivity were then applied to determine the overall risk and appropriate mitigation measures to be employed during construction phase activities. The key assessment steps are summarised in the following sections with the full IAQM guidance methodology provided in Appendix 6.3.

Stage 1 – Screen the Need for a Detailed Assessment

- 6.31. Stage 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the EIA Site boundary or 50m from the construction vehicle route up to 500m from the EIA Site entrance, then the assessment should proceed to Stage 2. Should ecological receptors be identified within 50m of the EIA Site or 50m from the construction vehicle routes up to 500m from the EIA Site entrance, then the assessment also proceeds to Stage 2.
- 6.32. Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Stage 2 – Assess the Risk of Impacts

- 6.33. Stage 2 assesses the risk of fugitive dust impacts, in which a site is allocated a risk category based on two factors. These are:
- The scale and nature of the works, which determines the magnitude of dust arising as: minor, moderate, or major (Stage 2A); and
 - The sensitivity of the area to dust impacts, which are defined as low, medium or high sensitivity (Stage 2B).
- 6.34. The two factors are combined in Stage 2C to determine the risk of dust impacts prior to the implementation of control measures. The relevant criteria used to determine the magnitude of works, and receptor sensitivity are detailed in Appendix 6.3.

Stage 3 – Site-Specific Mitigation

- 6.35. Stage 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Stage 2. For minor risk sites mitigation measures beyond those required by legislation are not required. However, additional controls may be applied.

Stage 4: Determine Significant Effects

- 6.36. Once the risk of dust impacts have been determined and the appropriate mitigation measures identified, the final stage is to determine the residual impact. For almost all construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible and residual impacts will be not significant.

Operational Phase – On Site Exposure Assessment

- 6.37. The EIA Site is located close to major roads which generate significant road traffic emissions, including the A56 and A57(M). The EIA Site is also located within the Greater Manchester AQMA which may indicate potential exposure impacts across the EIA Site by introducing future occupiers into areas of unacceptable air quality.
- 6.38. The suitability of the EIA Site with regards to future pollutant exposure was determined by modelling NO₂ and PM concentrations across the EIA Site using the ADMS-Road dispersion modelling software which is widely accepted within the UK by LAs, the Environment Agency and DEFRA. The dispersion modelling results were compared against the appropriate national AQOs detailed in Table 6.1. Any exceedance of the national AQOs at relevant sensitive receptor locations was determined as a significant impact and would require the implementation of protective measures.
- 6.39. The Proposed Development comprises varied land use sensitivities including, residential (Class C3) as well as various commercial and office use (Class E). As such, the application of the AQOs and averaging periods differs between each land use.
- 6.40. Table 6.3 provides a summary of each land use and which AQOs apply.

Table 6.3 – Proposed Land Use and AQOs.

Land Use	Appropriate AQO
Residential (Class C3)	Annual mean
	1-hour mean
Flexible Commercial Space (Class E(a)(b))	1-hour mean
Office Space (Class E(g))	1-hour mean

- 6.41. Pollutant contour plots displaying on site exposure are provided in Figures 6.7 to 6.9 of Appendix 6.1.

Construction and Operation Phase – Off Site Road Vehicle Exhaust Impacts

- 6.42. The construction and operational phases of the EIA Site will generate additional traffic on the local road network which may impact existing pollutant concentrations. Potential road traffic impacts associated with vehicles travelling to and from the EIA Site were initially screened against the criteria contained within the EPUK and IAQM guidance to determine the likely significance of impacts and if further detailed assessment work was necessary.
- 6.43. The EPUK and IAQM guidance document states the following with regards to road traffic impacts:
- Proposals which cause a change in Heavy Duty Vehicle (HDV) flows of more than 25 Annual Average Daily Traffic (AADT); and/or
 - Proposals which cause a change in Light Duty Vehicle (LDV) flows of more than 100 AADT.
- 6.44. Based on the information provided for the Proposed Development anticipated vehicle trips generated during the construction and operational phase are expected to exceed the EPUK and IAQM detailed assessment criteria given above. Subsequently, dispersion modelling was undertaken to calculate NO₂, PM₁₀ and PM_{2.5} concentrations at existing sensitive locations with and without development traffic in place to determine impacts and associated significance.
- 6.45. Construction phase road traffic impacts were based on information provided by the Applicant for the bulk dig works where maximum construction traffic generation will be present. Operational phase traffic generation was based on the combination of all development phases (Plots C7, C8, E1, E2 and Plot D). Each assessment scenario therefore assesses maximum anticipated traffic impacts.
- 6.46. Associated impacts were also informed by robust assumptions regarding the selection of emission factors. Reference should be made to Section 6.65 for more details.

Assessing the Significance of Effects

- 6.47. Receptors potentially sensitive to changes in NO₂ and PM concentrations were identified within 200 m of roads in which Proposed Development AADT flows exceed the criteria detailed in paragraph 6.43. The impact significance of

each receptor was defined in accordance with the criteria shown in Table 6.4. The asterisk denotes impacts that were considered to be significant.

Table 6.4 - EPUK and IAQM Impact Significance

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Minor	Moderate*
76 - 94% of AQO	Negligible	Minor	Moderate*	Moderate*
95 - 102% of AQO	Minor	Moderate*	Moderate*	Major*
103 - 109% of AQO	Moderate*	Moderate*	Major*	Major*

- 6.48. The criteria shown in Table 6.4 was adapted from the EPUK and IAQM guidance with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, were described as negligible in accordance with the EPUK and IAQM guidance.
- 6.49. Following the prediction of impacts at discrete receptor locations the EPUK and IAQM guidance suggests that a framework is to be used as a starting point to make a judgement on overall significance, but other influences may need to be accounted for.
- 6.50. For example, whilst 'minor' impacts may be determined as not significant and 'moderate' or 'major' impacts are deemed significant a number of additional factors apply to determine overall significance. This is because the overall effect might not necessarily be deemed as significant in some circumstances. For example, an individual property exposed to a 'major' adverse impact may not necessarily be considered a significant effect, but many hundreds of properties or a school/hospital exposed to a 'minor' adverse impact could be. The guidance relies on the practitioner's professional judgment and the consideration of the following factors may provide some assistance in determining overall significance:
- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
 - Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
 - The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
 - Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
 - The extent to which an objective is exceeded e.g. an annual mean NO₂ concentration of 41 µg/m³ should attract less significance than an annual mean of 51 µg/m³.
- 6.51. These factors were considered, and an overall significance determined for the impact of construction and operational phase road traffic emissions. Section 6.119 and Table 6.19 provide a summary of impact significance.

Scenarios Tested

Construction Phase

- 6.52. Road traffic impacts during the construction phase were assessed in accordance with the following scenarios:
- Scenario 1: Baseline + Cumulative;
 - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative.
- 6.53. Please note that Scenario 1 varies from the agreed EIA assessment scenarios for the purposes of this Chapter and considers anticipated future baseline conditions, in addition to traffic flows associated with cumulative schemes. This scenario provides a basis for assessing impact significance with and without the Proposed Development in place.
- 6.54. Construction phase road traffic would be present on the network during 2024, following the completion of 'Phase 2 Crown Street Phase 3 Plot E2'. It is anticipated that maximum construction traffic generation would be on the network during 2026 and 2027 where the construction of all development Plots will be concurrent.
- 6.55. As background concentrations are predicted to decline in future years, as emissions from new vehicles are reduced by the progressive introduction of higher emissions standards, an assessment of impacts in 2024 may not have produced a worst-case scenario should future improvements not materialise at the forecasted rate.

- 6.56. In light of this further sensitivity analysis was undertaken to review the effect of emission factors on the assessment results. To provide a precautionary approach, which does not correspond with comprehensive improvements predicted by DEFRA, construction phase road traffic impacts were assessed utilising 2019 emission factors.
- 6.57. This approach assumes no improvement to emission factors and is considered highly robust and is likely to overestimate actual conditions during the construction phase. As such, a sufficient degree of confidence can be placed on the results.

Operational Phase

- 6.58. The assessment of operational phase road traffic impacts considered the following scenarios:
- Scenario 1: Baseline + Cumulative;
 - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative.
- 6.59. Scenario 1 again varies from the agreed EIA assessment scenarios for the purposes of this Chapter to provide a basis for assessing impact significance with and without the Proposed Development in place.
- 6.60. With regards to associated impacts, the chosen scenario reflects maximum anticipated development traffic generation (Scenario 13) produced by all development phases and thus a worse-case traffic generation was assessed. The total number of vehicles generated by the operational phase would be realised at the anticipated scheme completion year (2032), upon completion of 'Phase 6 Plot D Residential Tower', with first occupation expected in 2027 upon completion of 'Phase 1 Plot D2 Office'.
- 6.61. As background concentrations are predicted to decline in future years, as emissions from new vehicles are reduced by the progressive introduction of higher emissions standards, an assessment of impacts in 2027 may not have produced a worst-case scenario should future improvements not materialise at the forecasted rate.
- 6.62. In light of this further sensitivity analysis was undertaken to review the effect of emission factors on the assessment results. To provide a precautionary approach, which does not correspond with comprehensive improvements predicted by DEFRA, operational phase impacts were assessed utilising 2024 emission factors. This approach assumes a degree of improvement, guided by government policy and measures detailed with the Greater Manchester AQAP, yet still maintains a suitably cautious approach. Further analysis was prepared using a mid-year emissions factor scenario of 2027 which represents the earliest EIA Site occupation following completion of 'Phase 1 Plot D2 Office'.
- 6.63. Results of the 2024 scenario are presented in the main Chapter with the result of the 2027 sensitivity analysis provided in Appendix 6.5.
- 6.64. The selection of each assessment scenario was based on the phasing set out in the phasing and delivery section of the ES. It was necessary to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to this chapter and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different air quality impacts as each scenarios take account of maximum traffic generation from all Proposed Development plots.
- 6.65. Furthermore, the choice of worse case emission factor scenarios is likely to result in overestimations and any resequencing of the development phasing will have diminutive influence on the air quality predictions.

The Study Area

- 6.66. The construction phase dust risk assessment considered receptor locations 350 m from the respective Plot boundaries and 50 m from construction vehicle routes up to 500 m for the EIA Site access as specified by the IAQM guidance. Figures 6.3 and 6.4 of Appendix 6.1 provides a map of the construction phase dust risk assessment extents.
- 6.67. The construction and operational phase road traffic impact assessment extents were determined by the affected traffic network defined using the assessment screening criteria detailed in Section 6.43. The modelled traffic network includes the following arterial roads:
- A57 (Mancunian Way)
 - A56 (Chester Road)
 - A56 (Bridgwater Way)
 - A5067 (Chorlton Road)
 - A5103 (Princess Street)

- 6.68. The modelling extents also encompass local minor roads, including Great Jackson Street, City Road East, Melbourne Street, Owen Street and Deansgate. The modelled receptor locations are displayed in Table 6.10 and Figure 6.5 of Appendix 6.1. The modelling extents are displayed in Figure 6.6 of Appendix 6.1.
- 6.69. In order to quantify pollutant exposure across all Plots ambient concentrations were modelled over the study area NGR: 383100, 379130 to 383500, 397380. This includes all areas of Phase 3 (Plots C and E) and Plot D.

Baseline Conditions

- 6.70. Available air quality data and the surrounding context was reviewed to provide a baseline for assessment. The process involved a review of nearby emission sources, periodic air quality monitoring data provided by Manchester City Council (MCC) and Salford City Council (SCC) and predicted background concentrations produced by DEFRA. Existing air quality conditions in the vicinity are detailed below.

Emission Sources

- 6.71. The main sources of pollutant emissions within the vicinity of the EIA Site are road vehicle exhaust emissions associated with the A57 (Mancunian Way) and A56 (Chester Road). Both arterial routes are located within 100 m of the EIA Site, with the A57 located closest to EIA Site, approximately 10 m south of Plot D. Therefore, the EIA Site can be considered as being close to a significant source of road vehicle exhaust emissions.
- 6.72. No other significant sources of emissions were identified within the assessment extents.

Air Quality Management Areas

- 6.73. As required by the Environment Act (1995), the Greater Manchester Combined Authority (GMCA), on behalf MCC, undertakes an annual review and assessment of air quality within the city. This process indicated that annual mean NO₂ concentrations exceed the relevant AQO at specific areas throughout the city. As such, AQMA has been declared and is described as:
- "Greater Manchester AQMA - This is the part of the Greater Manchester Combined Authority AQMA covering Manchester City Centre, the area around Manchester Airport and the main arterial traffic routes in the city".*
- 6.74. The EIA Site, like most of the City Centre, is located within the GMCA AQMA. As such, there is the potential to expose future residents to elevated pollutant concentrations, as well as to cause impacts within a sensitive area.
- 6.75. MCC have concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated. Figure 6.1 of Appendix 6.1 provides a map of the Greater Manchester AQMA in context of the EIA Site.

Local Air Quality Monitoring

- 6.76. Monitoring of pollutant concentrations is undertaken by MCC using continuous and periodic methods throughout their area of administration, a review of the most recent data indicated that there is currently one automatic analyser within the vicinity of the Proposed Development. SCC does not operate any automatic analysers within the assessment extents.
- 6.77. Table 6.5 presents the last four years of monitoring at the Manchester Oxford Road analysis. Exceedances of the relevant AQO are highlighted in **bold**.

Table 6.5 – MCC Automatic Analyser Locations and Monitoring Results

ID	Site Name	Site Type	Averaging Period	NO ₂ Concentration (µg/m ³)			
				2018	2019	2020	2021
MAN1	Manchester Oxford Road	Kerbside	Annual Mean	62.00	59.00	36.00	44.00
			1-hour Means (>200 µg/m ³)	2	1	0	0

- 6.78. As presented in Table 6.5, the annual mean AQO for NO₂ was exceeded in recent years at the Oxford Street automatic site, with the exception of 2020.
- 6.79. Exceedances are likely due to the kerbside location adjacent to an arterial road within an AQMA. As this monitoring location is classified as a Kerbside site it will only be considered further in context of the baseline assessment and not as part of model verification. This was agreed by MCC and is in accordance with LAQM.TG22 which suggests that the inclusion of kerbside locations within the verification procedure may lead to an over-estimate of modelled predictions at roadside locations. This can cause inaccuracies in the predicted exposure across the EIA Site and impacts at nearby sensitive roadside receptor locations.
- 6.80. No exceedances of the 1-hour mean AQO were observed in the last four years.

- 6.81. Caution should also be made when reviewing 2020 monitoring results given the impact of COVID-19 restrictions and significant reduction to traffic volumes. This is likely an explanation for the significant reduction in monitored annual mean concentrations during 2020.
- 6.82. MCC also employs passive diffusion tubes to monitor annual mean NO₂ concentrations throughout the city. A review of the latest diffusion tube monitoring data indicated four representative locations. Monitoring results from recent years are summarised in Table 6.6. Exceedances of the relevant AQO are shown in **bold**.

Table 6.6 – MCC Diffusion Tube Monitoring Locations and Results

ID	Site Name	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)			
			2018	2019	2020	2021
MA29A	Oxford Street	Roadside	58.77	55.39	39.02	44.83
MA77	Hewitt Street	Urban Background	40.99	43.66	26.92	30.76
MA82-84	Manchester Oxford Road	Roadside	52.84	51.31	33.88	40.73
MA97	Chester Road	Roadside	-	32.29	23.40	28.38

- 6.83. SCC also undertake Air Quality monitoring within 500 m of the EIA Site. A review of the latest data indicated two representative diffusion tube monitoring locations. Recent results from these locations are shown in Table 6.7, with exceedances of the relevant AQO highlighted in **bold**.

Table 6.7 – SCC Diffusion Tube Monitoring Locations and Results

ID	Site Name	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)			
			2018	2019	2020	2021
SA60	Regent Road	Roadside	40.23	36.66	27.02	32.59
SA81	Regent Road 2	Roadside	-	46.41	34.84	42.30

- 6.84. As shown in Table 6.6 and Table 6.7 there were exceedances of the annual mean AQO for NO₂ at all but one monitoring location in recent years.
- 6.85. 2019 monitoring results from locations closest to the EIA Site (MA97, SA60 and SA81) recorded annual mean NO₂ concentrations ranging between 32.3 µg/m³ and 46.4 µg/m³. A further review of other nearby monitoring locations indicates that pollutant concentrations within the study area are currently well above the AQO. These results provide an indication that NO₂ concentrations adjacent to the EIA Site could exceed the annual mean AQO for NO₂ although monitoring data suggests an overall improvement over the last four years. As such, detailed modelling was undertaken to quantify on-site pollutant concentrations.
- 6.86. Nearby roadside monitors, including Chester Road (97), Regent Road (SA60/81) are situated 10 m from arterial traffic routes and provide a strong comparison to the affected road network and receptor locations. These locations were therefore used within the ADMS-Roads to undertake the model verification process. Similar to the Oxford Road analyser, both Oxford Street (29A) and Oxford Road (82-84) do not provide a good representation of the EIA Site given the presence of street canyon effects as well as heavily trafficked bus routes.
- 6.87. The closest passive diffusion tube monitor, Hewitt Street (MA77), is classified as an urban background site and could provide a suitable representation of worse case background concentrations across the modelling extents.
- 6.88. Monitoring of PM₁₀ and PM_{2.5} is not currently undertaken by MCC or SCC in the vicinity of the EIA Site.
- 6.89. Figure 6.2 of Appendix 6.1 provides a map of monitoring locations within assessment extents.

Background Pollutant Concentrations

- 6.90. Predictions of background pollutant concentrations on a 1 km by 1 km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their review and assessment of air quality. The EIA Site is located in grid square NGR: 383500, 397500 and data was downloaded from the DEFRA website for the purpose of this assessment. Table 6.8 provides a summary of the most recent baseline year pre-COVID restrictions (2019) and future year predictions for 2024 and 2027.

Table 6.8 – Predicted Annual Mean Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m ³)		
	Baseline Year 2019	Future Year 2024	Future Year 2027
NO ₂	26.07	21.29	19.55
PM ₁₀	13.47	12.69	12.55
PM _{2.5}	8.69	8.13	8.03

- 6.91. Comparison with the monitored data indicates the influence of road vehicle exhaust emissions upon total roadside pollutant concentrations.

Review of Background NO₂ Concentrations

- 6.92. A comparison of monitored background concentrations was undertaken in the study area to establish the most representative conditions for the EIA Site and surrounding receptor locations. A review of the MCC and SCC monitoring data determined that Hewitt Street (MA77) is the only urban background located within the assessment extents. Table 6.9 present a comparison of measured data and DEFRA background predictions.

Table 6.9 – Monitored vs Predicted Background Concentrations

Source	Concentration (µg/m ³)
DEFRA	26.07
MA77	43.66

- 6.93. Whilst MA77 provides a worse case background concentrations it is influenced by major emission sources including the A5103 and Manchester Oxford Road rail line. This is reflected by 2019 concentrations which exceed a number of roadside monitors in the area. LAQM.TG22 suggests that there should be no major sources of pollution within 50 m of a background site and as such MA77 was not considered to represent background conditions.
- 6.94. As all primary and trunk A-roads were modelled within the assessment extents it was necessary to avoid double counting and therefore the application of a roadside monitored concentrations as the background component was considered inappropriate. As such, predicted background concentrations produced by DEFRA informed baseline and future year scenarios.

Sensitive Receptor Locations

- 6.95. A sensitive receptor is defined as any location which may be affected by changes in air quality as a result the Proposed Development. These have been defined for construction dust impacts in the following Sections.

Construction Phase Dust Risk Assessment

- 6.96. A desktop screening assessment (Stage 1) identified sensitive human receptors within 350 m of the EIA Site boundary, and within 50 m of the anticipated trackout. The majority of receptor locations within these areas represent residential, educational, commercial, and retail premises where members of the public might reasonably be expected to spend one hour or more.
- 6.97. Receptors sensitive to potential fugitive dust impacts are summarised in Section 5.1 with results of the risk assessment detailed in Section 6.106.
- 6.98. Figure 6.3 and Figure 6.4 of Appendix 6.1 provide maps of the construction phase dust risk assessment extents.

Construction and Operational Road Traffic Assessments

- 6.99. A desk-top study was undertaken to identify worst case sensitive receptor locations adjacent to the affected road network. Modelled receptor locations have been considered where construction or operational traffic flows exceed the EPUK and IAQM thresholds detailed in Section 6.43.
- 6.100. The majority of receptor locations represent residential and educational premises where members of the public might reasonably be expected to spend one hour or more. The commercial locations represent retail properties where members of the public could have regular access.
- 6.101. The selection of receptors was based on a worse case approach by which they represent the most sensitive locations across the modelling extents. For this assessment, this concerns sensitive locations adjacent to roads predicted to experience the greatest traffic increases as a result of the Proposed Development and those with the highest baseline traffic flows. The receptors most impacted by the development are not necessarily those located closest to the EIA Site.
- 6.102. This approach ensures that locations specified in Table 6.10 represent receptors with the greatest potential adverse impacts from the operation of the Proposed Development. Therefore it is considered that this Chapter has assessed the worst case operational air quality impacts.
- 6.103. Table 6.10 and Figure 6.5 of Appendix 6.1 presents the modelled sensitive human receptor locations.

Table 6.10 – Road Traffic Sensitive Receptor Locations

Receptor Name		NGR (m) X	Y	Modelled Height (m)	Distance to Site (m)
HR1	Residential - Chester Road	382887.0	397207.0	1.5	557
HR2	Residential - Chester Road	382936.0	397225.0	4.5	509
HR3	Residential - Chester Road	382854.0	397237.0	1.5	592
HR4	Residential - Chester Road	382912.0	397297.0	1.5	543
HR5	Residential - Chester Road	382912.0	397297.0	3.5	543
HR6	Residential - Egerton Street	382973.0	397347.0	4.5	497
HR7	Residential - Egerton Street	382973.0	397347.0	8.0	497
HR8	Residential - Egerton Street	382912.0	397396.0	5.5	571
HR9	Residential - Egerton Street	382912.0	397396.0	8.0	571
HR10	Residential - Worsley Mill	382864.7	397438.3	1.5	631
HR11	Residential - Worsley Mill	382864.7	397438.3	3.1	631
HR12	Residential - Mancunian Way	383251.0	397127.0	1.5	201
HR13	Residential - Chester Road	383216.0	397424.0	1.5	329
HR14	Residential - City Road East	383502.0	397254.0	5.5	89
HR15	Residential - City Road East	383556.0	397281.0	3.0	147
HR16	Residential - City Road East	383588.0	397372.0	1.5	235
HR17	Residential - Albion Street	383610.0	397476.0	4.5	334
HR18	Residential - Albion Street	383651.6	397543.1	4.5	413
HR19	Residential - Bridgewater Viaduct	383305.5	397447.4	0.5	295
HR20	Residential - Whitworth Street East	383715.1	397519.4	4.0	430
HR21	Commercial - Crown Street Phase 1	383099.1	397277.9	1.5	356
HR22	Residential - Crown Street Phase 1	383085.9	397306.0	5.1	377
HR23	Residential - Crown Street Phase 1	383128.2	397326.1	5.1	345
HR24	Residential - Crown Street Phase 1	383180.2	397315.9	5.1	293
HR25	Educational - Crown Street Phase 2	383108.7	397244.6	1.5	340
HR26	Residential - Crown Street Phase 2	383127.2	397233.9	1.5	320
HR27	Residential - Crown Street Phase 2	383190.8	397206.9	1.5	253
HR28	Residential - Deansgate Square South Tower	383391.9	397252.1	1.5	83
HR29	Residential - Castle Wharf	383254.4	397442.1	8.0	318
HR30	Educational - Procter Young Peoples Centre	383447.5	397093.9	1.5	93
HR31	Residential - Hunmanby Avenue Ground Floor	383596.0	397102.4	1.5	174
HR32	Residential - Hunmanby Avenue First Floor	383596.0	397102.4	7.0	174
HR33	Residential - Rockdove Avenue Ground Floor	383648.1	397092.5	1.5	225
HR34	Residential - Rockdove Avenue First Floor	383648.1	397092.5	7.0	225
HR36	Residential - Clarendon Street Ground Floor	383863.7	397054.4	1.5	441
HR37	Residential - Clarendon Street First Floor	383863.7	397054.4	7.0	441
HR38	Residential - Parkway Gate	383882.7	397102.2	7.5	447
HR39	Commercial - Premier Inn	383683.8	397189.9	1.5	240
HR40	Commercial - Premier Inn	383655.4	397160.7	1.5	214
HR41	Residential - Canvas Manchester	383569.1	397150.3	5.0	131

6.104. Receptors modelled at 1.5 m to represent the average UK “breathing height” above ground level. Receptors modelled at heights above this level represent upper floors.

Ecological Receptors

6.105. There are no local or nationally designated ecological receptors within 50 m of the EIA Site boundary/trackout routes or within 200 m of the affected road network. As such, construction and operational impacts upon ecological designations were not assessed further.

Identification and Evaluation of Likely Significant Effects

Construction Phase – Dust Impacts

6.106. A desk top screening assessment (Stage 1) identified sensitive receptors within 350 m of the EIA Site boundary, and within 50 m of the anticipated trackout. The number of receptors is summarised in Table 6.11.

Table 6.11 – Construction Dust Risk Assessment – Sensitive Receptor Counts

Distance from Site or Trackout Routes (m)	Approximate Number of Receptors
Earthworks and Construction	
Less than 20	10 – 100
20 – 50	More than 100
50 – 100	More than 100
100 – 350	More than 100
Trackout	
Less than 20	More than 100
20 – 50	More than 100

Magnitude

6.107. The scale and nature of construction works were determined to assess the magnitude (Stage 2) of fugitive dust emissions arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix 6.3.

Demolition

6.108. Crown Street Phase 3 is currently occupied by a range of buildings including Gaddum House and Deansgate Square Marketing Suite. Plot D is currently in use as a concrete batching plant. Based on a worse case building volume of less than 20,000 m³ the magnitude of dust emissions from demolition processes was minor.

Earthworks

6.109. On-Site made ground consists of gravelly fine to coarse sand with slightly gravelly sandy clay. Based on this information the soil type was considered to be moderately dusty given the mix of larger grain sands and clay, which is prone to suspension when dry due to small particle size.

6.110. The EIA Site area of Crown Street Phase 3 and Plot D is approximately at 15,500 m², and when combined with the made ground and expected material exports the magnitude of potential dust emissions related to earthwork activities was considered major.

Construction

6.111. Construction volumes will exceed the 100,000 m³ IAQM threshold and the magnitude of potential dust emissions related to construction activities was considered major.

Trackout

6.112. The Proposed Development will generate approximately 70 HGV trips during peak construction, it is also anticipated that the unpaved road length is likely to be greater than 100 m. The magnitude of potential dust emissions related to construction activities was considered major.

6.113. A summary of the construction phase magnitudes is detailed in Table 11.

Table 6.12 – Dust Emission Magnitude

Demolition	Earthworks	Construction	Trackout
Minor	Major	Major	Major

Sensitivity of Area

6.114. The next step (Stage 2B) was to determine the sensitivity of the surrounding area, based on the number, proximity, and type of receptors. To ensure a worse case assessment all surrounding receptors were assumed to be highly sensitive (e.g. residential).

6.115. The sensitivity of the area for both dust soiling and human health is summarised in Table 6.13.

Table 6.13 – Sensitivity of the Surrounding Area

Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Major	Major	Major	Major
Human Health	Minor	Minor	Minor	Moderate

Risk

- 6.116. The next stage of the assessment (Stage 2C) combined the dust magnitude and receptor sensitivity defined above to determine the overall risk with no mitigation applied. This is summarised in Table 6.14.

Table 6.14 – Summary of Unmitigated Dust Risk

Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Moderate	Major	Major	Major
Human Health	Negligible	Minor	Minor	Moderate

- 6.117. As presented in Table 6.14 the Proposed Development represents a 'major adverse risk' of dust effects associated with construction activities. Potential impacts are considered to affect the local area and are temporary and reversible in nature.
- 6.118. Appropriate measures have been adapted for the Proposed Development and summarised in Table 6.21. The measures will be reviewed prior to the commencement of construction works and incorporated into existing strategies where practical. Assuming that all recommended mitigation measures are implemented effectively, the overall impact significance from all dust generating activities was determined to be not significant.

Construction Phase – Road Traffic Impacts

- 6.119. Construction is due to commence in 2024 for Plot E2 (Phase 2) with peak construction phase traffic anticipated during 2026/2027 where all Plots are under construction, albeit at different stages.
- 6.120. Based on the information provided the Applicant, it was anticipated that the maximum number of vehicles travelling to and from the EIA Site during the construction phase was predicted as 90 AADT (78% HGV). This flow represents movements during the 'bulk dig' stage.
- 6.121. During the 'Steady state' phase (Frame construction, façade and fit out) the number of construction vehicles is set to reduce significantly to a maximum of 28 AADT (29% HGV) per day. Based on the anticipated AADT, a dispersion modelling assessment was undertaken in accordance with the EPUK and IAQM guidance to quantify potential changes in pollutant concentrations at sensitive locations.
- 6.122. To provide a worse case emission scenario, maximum traffic generation during 2026/2027 was combined with 2019 emission factors. The choice of this scenario does not reflect any improvements to future year emission factors and ensures a worse case approach which is subject to a high degree of overestimation.
- 6.123. A result of construction phase traffic the change in concentrations relative to the AQOs was predicted at 0.6% for NO_2 and 0.1% for PM_{10} , $\text{PM}_{2.5}$ and $\text{PM}_{2.5}$.
- 6.124. Impacts on annual mean NO_2 concentrations were determined to be negligible at 38 receptor locations and moderate adverse on a temporary basis at 2 modelled receptor locations (HR6 and HPM10). $\text{PM}_{2.5}$ impacts on PM_{10} and $\text{PM}_{2.5}$ were predicted to be negligible at all 40 modelled receptor locations.
- 6.125. The moderate impacts are isolated to ground floor areas of two residential apartment blocks adjacent to the A57 (Egerton Street) in which it was not possible to verify the presence of residential use. Analysis of the upper floor levels at receptors HR7 and HR11, in which negligible impacts are predicted, confirm moderate impacts diminish with increased distance from the emission source. As such, if residential use is present moderate adverse impacts only affect a limited number of ground floor properties. Crucially, the moderate adverse impacts do not reflect overall impacts across the network.
- 6.126. As construction phases impacts and are considered temporary and reversible in nature associated impact significance was determined to be not significant. Results of the construction phase road traffic impact assessment are provided in Appendix 6.4.

Operational Phase – On-Site Exposure

- 6.127. The Proposed Development has potential to expose future occupants to elevated NO_x , PM_{10} and $\text{PM}_{2.5}$ concentrations associated with road traffic emissions from the adjacent road network. Annual mean concentrations were predicted at sensitive uses across the EIA Site during the DS scenario to represent ground floor exposure in 2024.
- 6.128. Table 6.15 presents predicted concentrations across each Plot of the Proposed Development.

Table 6.15 – Predicted Maximum Annual Mean Concentrations at Proposed Sensitive Use

Floor Level	Site Area	Predicted Annual Mean Concentration		
		PM_{10} (AQO – $40 \mu\text{g}/\text{m}^3$)	$\text{PM}_{2.5}$ (AQO – $25 \mu\text{g}/\text{m}^3$)	
Ground (1.5m)	Plot C7	32.3	15.1	9.5
	Plot C8	27.6	14.2	9.0
	Plot D1 (Residential)	36.4	15.5	9.8
	Plot D2 (Office)	39.4	16.2	10.3
	Plot E1	27.7	14.4	9.1
	Plot E2	28.7	14.9	9.4

- 6.129. As presented in Table 6.15 on-Site concentrations were not predicted to exceed the annual mean AQOs at any ground floor sensitive use across Plots C, D and E. Based on the results the implementation of mitigation measures to protect future occupants is not necessary.
- 6.130. 1-hour NO_2 or 24-hour PM_{10} concentrations are applicable across Plot D2 but were not produced as part of the dispersion modelling assessment. However, as stated in LAQM.Tm³² if annual mean NO_2 concentrations are below $60 \mu\text{g}/\text{m}^3$ then it is unlikely that the 1-hour AQO will be exceeded. Similarly, if the annual PM_{10} concentrations are below $32 \mu\text{g}/\text{m}^3$ then it is unlikely that the 24-hour AQO will be exceeded.
- 6.131. Annual mean NO_2 and PM_{10} concentrations across Plot D are predicted as $39.4 \mu\text{g}/\text{m}^3$ and $16.2 \mu\text{g}/\text{m}^3$ and both 1-hour and 24-hour AQOs are not predicted to exceed short term AQOs at any location across Plot D2.
- 6.132. Impacts on future occupants from long and short term pollutant exposure are determined to be negligible on a permanent basis, and the associated impact significance was determined to be not significant.
- 6.133. Reference should be made to Figures 6.7 to 6.9 for a representation of contour plots for the predicted annual mean NO_2 , PM_{10} and $\text{PM}_{2.5}$ concentrations.

Operational Phase – Road Traffic Impacts

- 6.134. Based on the anticipated AADT trip generation provided by Curtins, a dispersion modelling assessment was undertaken to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the EIA Site.
- 6.135. Annual mean concentrations were predicted at existing off-Site sensitive receptors with and without the Proposed Development to assess the impact of road traffic emissions on the surrounding environment. Analysis without the Proposed Development in place is referred to as the 'DM scenario' and with the Proposed Development in place as the 'DS scenarios'.
- 6.136. Results are summarised in Table 6.16 to Table 6.17 for each pollutant species. The results are based on the combination of traffic predictions during 2032 and 2024 emission factors. All impacts are defined as regional and permanent nature, with exceedances of the relevant AQOs are highlighted in **bold**.

Predicted NO₂ concentrations at Sensitive Receptors

6.137. Annual mean NO₂ concentrations are summarised in Table 6.16.

Table 6.16 – Predicted Annual Mean NO₂ Concentrations

Receptor	Predicted Annual Mean Concentration (µg/m ³)			% Change in Concentration Relative to AQO	Long Term Average Concentration Relative to AQO	Impact Descriptor
	DM	DS	Change			
HR1	24.0	24.2	0.2	0.4	75% or Less	Negligible
HR2	22.9	23.1	0.2	0.4	75% or Less	Negligible
HR3	29.9	30.1	0.2	0.6	75% or Less	Negligible
HR4	30.2	30.5	0.3	0.9	76-94%	Negligible
HR5	29.4	29.7	0.3	0.8	75% or Less	Negligible
HR6	42.0	42.5	0.5	1.4	103-109%	Moderate Adverse
HR7	37.5	38.0	0.5	1.2	95-102%	Slight Adverse
HR8	31.8	32.2	0.4	0.9	76-94%	Negligible
HR9	27.2	27.5	0.3	0.7	75% or Less	Negligible
HR10	41.7	42.2	0.5	1.4	103-109%	Moderate Adverse
HR11	39.4	39.9	0.5	1.3	95-102%	Slight Adverse
HR12	25.7	25.8	0.1	0.3	75% or Less	Negligible
HR13	29.6	30.1	0.5	1.2	75% or Less	Negligible
HR14	28.6	29.7	1.1	2.7	75% or Less	Negligible
HR15	28.7	29.9	1.2	3.0	75% or Less	Negligible
HR16	25.3	25.9	0.6	1.4	75% or Less	Negligible
HR17	27.2	27.4	0.2	0.5	75% or Less	Negligible
HR18	25.6	25.7	0.1	0.2	75% or Less	Negligible
HR19	28.3	28.6	0.3	0.7	75% or Less	Negligible
HR20	24.7	24.7	0.1	0.2	75% or Less	Negligible
HR21	34.6	35.2	0.6	1.4	76-94%	Negligible
HR22	31.1	31.5	0.4	1.1	76-94%	Negligible
HR23	27.4	27.8	0.3	0.8	75% or Less	Negligible
HR24	25.7	26.0	0.3	0.7	75% or Less	Negligible
HR25	41.9	42.5	0.6	1.5	103-109%	Moderate Adverse
HR26	42.1	42.7	0.6	1.5	103-109%	Moderate Adverse
HR27	40.2	40.9	0.7	1.8	103-109%	Moderate Adverse
HR28	26.4	26.7	0.4	0.9	75% or Less	Negligible
HR29	26.1	26.4	0.3	0.7	75% or Less	Negligible
HR30	24.9	25.0	0.1	0.3	75% or Less	Negligible
HR31	28.6	28.7	0.2	0.4	75% or Less	Negligible
HR32	27.3	27.5	0.2	0.4	75% or Less	Negligible
HR33	28.9	29.1	0.2	0.4	75% or Less	Negligible
HR34	27.6	27.7	0.2	0.4	75% or Less	Negligible
HR35	25.6	25.8	0.1	0.4	75% or Less	Negligible
HR36	24.9	25.0	0.1	0.3	75% or Less	Negligible
HR37	33.5	33.8	0.3	0.6	76-94%	Negligible
R39	34.1	34.5	0.4	1.0	76-94%	Negligible
HR40	33.4	33.7	0.3	0.7	76-94%	Negligible

6.138. Annual mean NO₂ concentrations were predicted to exceed the relevant AQO at 5 receptor locations during the DM and DS scenarios. No new exceedances of the annual mean AQO are anticipated as a result of the Proposed Development. The remaining 35 receptor location NO₂ were M³ below the relevant AQO. All predicted annual-mean NO₂ concentrations are below 60 µg/m³, and the 1-hour mean AQO is not expected to be exceeded at any receptor location.

6.139. Road vehicle exhaust impacts are predicted to be negligible on a permanent basis at 33 receptor locations, minor adverse on a permanent basis at 2 locations and moderate adverse NO₂ on a permanent basis at 5 receptor locations.

6.140. Overall, the impact on the surrounding area from additional NO₂ concentrations is considered to be ‘minor adverse’ and therefore not significant. Further justifications using the EPUK and IAQM aPM₁₀sment criteria and professional judgement is prPM₁₀ed in Table 6.19.

Predicted PM₁₀ concentrations at Sensitive Receptors

6.141. Annual mean PM₁₀ concentrations PM₁₀summarised in Table 6.17.

Table 6.17 – Predicted Annual Mean PM₁₀ Concentrations

Receptor	Predicted Annual Mean Concentration (µg/m ³) DM	DS	Change	% Change in Concentration Relative to AQO	Long Term Average Concentration Relative to AQO	Impact Descriptor
HR1	14.2	14.2	0.0	0.1	75% or Less	Negligible
HR2	13.9	13.9	0.0	0.1	75% or Less	Negligible
HR3	15.6	15.6	0.1	0.1	75% or Less	Negligible
HR4	15.4	15.5	0.1	0.2	75% or Less	Negligible
HR5	15.2	15.3	0.1	0.2	75% or Less	Negligible
HR6	17.4	17.6	0.1	0.3	75% or Less	Negligible
HR7	16.5	16.6	0.1	0.3	75% or Less	Negligible
HR8	15.2	15.2	0.1	0.2	75% or Less	Negligible
HR9	14.4	14.5	0.1	0.2	75% or Less	Negligible
HR10	18.9	19.1	0.2	0.4	75% or Less	Negligible
HR11	18.2	18.4	0.1	0.3	75% or Less	Negligible
HR12	13.8	13.8	0.0	0.1	75% or Less	Negligible
HR13	15.4	15.6	0.1	0.3	75% or Less	Negligible
HR14	14.8	15.1	0.3	0.8	75% or Less	Negligible
HR15	15.0	15.3	0.4	0.9	75% or Less	Negligible
HR16	14.2	14.3	0.2	0.4	75% or Less	Negligible
HR17	14.7	14.7	0.1	0.1	75% or Less	Negligible
HR18	14.3	14.3	0.0	0.1	75% or Less	Negligible
HR19	15.1	15.2	0.1	0.2	75% or Less	Negligible
HR20	14.1	14.1	0.0	0.1	75% or Less	Negligible
HR21	15.7	15.8	0.1	0.3	75% or Less	Negligible
HR22	15.1	15.2	0.1	0.3	75% or Less	Negligible
HR23	14.4	14.5	0.1	0.2	75% or Less	Negligible
HR24	14.0	14.0	0.1	0.1	75% or Less	Negligible
HR25	16.6	16.7	0.1	0.3	75% or Less	Negligible
HR26	16.6	16.7	0.1	0.3	75% or Less	Negligible
HR27	16.2	16.4	0.2	0.4	75% or Less	Negligible
HR28	14.1	14.2	0.1	0.2	75% or Less	Negligible
HR29	14.4	14.5	0.1	0.2	75% or Less	Negligible
HR30	13.7	13.7	0.0	0.1	75% or Less	Negligible
HR31	14.3	14.3	0.0	0.0	75% or Less	Negligible
HR32	14.1	14.1	0.0	0.1	75% or Less	Negligible
HR33	14.5	14.5	0.0	0.1	75% or Less	Negligible
HR34	14.2	14.3	0.0	0.1	75% or Less	Negligible
HR35	14.0	14.0	0.0	0.1	75% or Less	Negligible
HR36	13.8	13.8	0.0	0.1	75% or Less	Negligible
HR37	15.2	15.2	0.1	0.1	75% or Less	Negligible
HR38	15.6	15.7	0.1	0.2	75% or PM ₁₀	Negligible
HR39	15.7	15.8	0.1	0.2	75% or Less	Negligible
HR40	15.0	15.1	0.0	0.1	75% or Less	Negligible

6.142. Annual mean PM₁₀ concentrations were predPM₁₀d to be well below the relevm³t AQO at all 40 receptor locations during the DM and DS scenarios. All predicted annual-mean PM₁₀ concentrations are below 32 µg/m³, and the 1-hour mean AQO is not expected to be exceeded at any receptor location.

6.143. Road vehicle exhaust impacts are prediPM₁₀ to be negligible on a permanent basis at all 40 receptor locations. Overall, the impaPM_{2.5} the surrounding area from additional PM₁₀ conPM_{2.5}ations is considered to be ‘negligible’ and therefore not significant.

Predicted PM_{2.5} concentrations at Sensitive Receptors

6.144. Annual PM_{2.5} concentrations are summarised in Table 6.17.

Table 6.17 – Predicted Annual Mean PM_{2.5} Concentrations

Receptor	Predicted Annual Mean Concentration (µg/m³)			% Change in Concentration Relative to AQO	Long Term Average Concentration Relative to AQO	Impact Descriptor
	DM	DS	Change			
HR1	9.0	9.1	0.0	0.1	75% or Less	Negligible
HR2	8.9	8.9	0.0	0.1	75% or Less	Negligible
HR3	9.8	9.9	0.0	0.1	75% or Less	Negligible
HR4	9.8	9.8	0.1	0.2	75% or Less	Negligible
HR5	9.7	9.7	0.0	0.2	75% or Less	Negligible
HR6	11.0	11.1	0.1	0.3	75% or Less	Negligible
HR7	10.5	10.6	0.1	0.3	75% or Less	Negligible
HR8	9.7	9.8	0.0	0.2	75% or Less	Negligible
HR9	9.2	9.3	0.0	0.1	75% or Less	Negligible
HR10	11.8	11.9	0.1	0.4	75% or Less	Negligible
HR11	11.4	11.5	0.1	0.3	75% or Less	Negligible
HR12	8.8	8.9	0.0	0.0	75% or Less	Negligible
HR13	9.7	9.8	0.1	0.3	75% or Less	Negligible
HR14	9.4	9.6	0.2	0.7	75% or Less	Negligible
HR15	9.5	9.7	0.2	0.8	75% or Less	Negligible
HR16	9.0	9.1	0.1	0.4	75% or Less	Negligible
HR17	9.3	9.3	0.0	0.1	75% or Less	Negligible
HR18	9.0	9.1	0.0	0.0	75% or Less	Negligible
HR19	9.5	9.6	0.0	0.2	75% or Less	Negligible
HR20	9.0	9.0	0.0	0.0	75% or Less	Negligible
HR21	10.0	10.0	0.1	0.3	75% or Less	Negligible
HR22	9.6	9.6	0.1	0.2	75% or Less	Negligible
HR23	9.2	9.2	0.0	0.2	75% or Less	Negligible
HR24	8.9	9.0	0.0	0.2	75% or Less	Negligible
HR25	10.6	10.7	0.1	0.3	75% or Less	Negligible
HR26	10.6	10.7	0.1	0.3	75% or Less	Negligible
HR27	10.4	10.5	0.1	0.4	75% or Less	Negligible
HR28	9.0	9.0	0.1	0.2	75% or Less	Negligible
HR29	9.1	9.2	0.0	0.1	75% or Less	Negligible
HR30	8.8	8.8	0.0	0.0	75% or Less	Negligible
HR31	9.1	9.2	0.0	0.1	75% or Less	Negligible
HR32	9.0	9.0	0.0	0.1	75% or Less	Negligible
HR33	9.2	9.3	0.0	0.1	75% or Less	Negligible
HR34	9.1	9.1	0.0	0.1	75% or Less	Negligible
HR35	8.9	8.9	0.0	0.1	75% or Less	Negligible
HR36	8.8	8.8	0.0	0.0	75% or Less	Negligible
R38	9.8	9.9	0.1	0.2	75% or Less	Negligible
HR39	9.9	10.0	0.1	0.2	75% or Less	Negligible
HR40	9.6	9.7	0.0	0.1	75% or Less	Negligible

6.145. Annual mean PM_{2.5} concentrations predicted to be well below the relevant AQO at all 40 receptor locations during the DM and DS scenarios.

6.146. Road vehicle ePM_{2.5} impacts are predicted to be negligible on a permanent basis at all 40 receptor locations. Overall, the impact on the surrounding area from additional PM_{2.5} concentrations is considered to be 'negligible' and therefore not significant.

6.147. Table 6.18 presents a summary of predicted operational impNO₂s.

Table 6.18 – Summary of Operational Phase Impacts

Pollutant and Period	Receptors	EPUK & IAQM Significance Descriptor
PM ₁₀ al Mean NO ₂	All Receptors	- Negligible at 33 Receptor LocationPM_{2.5}nor - Adverse at 2 Receptor Locations; and Moderate Adverse at 5 Receptor Locations
Annual Mean PM ₁₀	All Receptors	Negligible at 40 Receptor Locations
Annual Mean PM _{2.5}	All Receptors	Negligible at 40 Receptor Locations

Sensitivity Analysis

- 6.148. To reflect future decreases in background concentrations predominantly resulting from improved vehicNO₂PM₁₀PM_{2.5}standards, a mid-year scenario of 2027 was undertaken using 2032 traffic flows and future year emission prediction during 2027.
- 6.149. Predicted impacts on annual mean NO₂, PM₁₀ and PM_{2.5} pollutant concentrations were negligible at all 40 sensitive receptor locations during the 2027 scenario. The maximum change in concentrations relative to the AQOs was predicted as 2.2% for NO₂, 0.9% for PM₁₀ and 0.8% PM_{2.5}. Impacts on annual mean concentrations are therefore not significant on a permanent basis.
- 6.150. The analysis of future conditions confirms that ‘moderate adverse’ impacts identified during the 2024 scenario are likely to diminish following predicted improvements to background concentrations and emissions from new vehicles. Therefore, a sufficient level of confidence can be placed on the predictions and overall significance of impacts is not significant.
- 6.151. Results of the operational phase sensitivity analysis are provided in Appendix 6.5.

Operational Phase Impact Significance Discussion

- 6.152. Following the prediction of impacts at discrete receptor locations the EPUK and IAQM guidance suggests that a framework is to be used as a starting point to make a judgement on overall significance. This process is outlined in Table 6.20, based on the considerations in Section 6.49.

Table 6.19 – Summary of Overall Road Traffic Exhaust Emission Impact Significance

Pollutant and Period	Receptors
Number of properties affected by minor, moderate or major air quality impacts and a judgement on the overall balance	Impacts on annual mean NO₂ concentrations during the 2024 emission scenario were predicted to be negligible on a permanent basis at 33 receptor locations, minor adverse on a permanent basis at 2 locations, and moderate adverse on a permanent basis at 5 receptor locations. Impacts on PM₁₀ and PM_{2.5} concentrations were predicted to be negligible on a permanent basis at all receptor receptors. Associated impacts were based on sensitivity analysis in which the use of 2032 operational traffic data, together with 2024 emission factors does not consider future improvements to background concentrations and vehicle emissions predicted by DEFRA. This approach significantly overestimates actual pollutant concentrations expected when the Proposed Development is fully operation in 2032. Therefore, a sufficient level of confidence can be placed within the predicted emission levels and conclusions regarding impact significance. The 5 receptor locations at which moderate adverse impacts were predicted are isolated within two distinct areas. One area adjacent to A57 Egerton Street and the Mancunian Way slip road, contains 2 of the 5 moderately affected receptor locations. The second area, immediately adjacent to the A57(M) includes 3 locations across Great Jackson Street Framework, specifically locations within the Crown Street Phase 2 development. Analysis of the upper floor locations at HR6 and HR10 confirm that moderate adverse impacts diminish with increased distance from the emission source. Impacts at HR7 and HR11 which represent first floor exposure above HR6 and HR10, are predicted to experience minor adverse impacts and predicted concentrations are below the annual mean AQO. Locations HR25, HR26 and H27 which represent Crown Street Phase 2 receptors are to be fitted with protective mitigation as per the accompanying Air Quality Assessment. This will ensure the moderate impacts are suitably mitigated and will not pose an unacceptable risk to future occupiers.

Pollutant and Period	Receptors
	Based on further analysis, moderate adverse impacts do not affect a large proportion of the population are confined to isolated areas and do not represent overall impacts across the wider assessment extents. Furthermore, analysis of the 2027 emission factor scenario confirmed resultant impacts were negligible on a permanent basis in accordance with the EPUK and IAQM criteria. This suggests moderate adverse impacts are unlikely to be present during the first occupation or following completion of the Proposed Development in 2032. The overall significance of air quality impacts as a result of the Proposed Development is therefore deemed 'minor adverse' and considered not significant.
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	There were no predicted exceedances of the annual mean AQOs at any sensitive location across the EIA Site. The Proposed Development is not predicted to introduce new exposure above the AQO at any offsite location. Exposure impacts are therefore negligible on a permanent basis and considered not significant.
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	Worse case changes in concentrations relative to the annual mean AQO for NO₂ was predicted as 3.0% at HR15 during the 2024 emission scenario. Resultant impacts were therefore described as either negligible, minor adverse or moderate adverse on a permanent basis in accordance with the EPUK and IAQM criteria. 33 of the 40 receptor locations were predicted to experience negligible impacts on a permanent basis, and therefore the overall balance is considered not significant. The change in concentrations relative to the AQO for PM₁₀ and PM_{2.5} was predicted to range from <0.1% to 0.9% and <0.1% to 0.2%, respectively. Resultant impacts were therefore described as negligible impacts on a permanent basis at all sensitive receptors. The overall significance of air quality impacts as a result of the Proposed Development is therefore deemed 'minor adverse' and considered not significant.
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a major increase or decrease	There were exceedances of the AQOs for NO₂ at 5 sensitive receptor locations within the modelling extents during the 2024 emission scenario. Critically, all exceedances were predicted during both the DM and DS and therefore no new exposure will be introduced by the operation of the Proposed Development. There were no predicted exceedances of the annual mean AQOs for PM₁₀ or PM_{2.5} at any location within the modelling extents. Analysis of the 2027 emission factor scenario did not identify exceedances of the AQOs across the modelling extents. Therefore, exceedances of the AQOs were not predicted to arise as a result of a major increases associated with the Proposed Development.
The extent to which an objective is exceeded e.g. an annual mean NO ₂ concentration of 41 µg/m ³ should attract less significance than an annual mean of 51 µg/m ³	Exceedances of the annual mean AQO for NO₂ were predicted at 5 existing receptor locations, with a maximum concentration of 42.5 µg/m³ (HR26). The AQO was not exceeded by a large margin and were predicted during both the DM and DS and cannot be directly accounted to the operation of the Proposed Development. Such exceedances attract less significance.

- 6.153. The overall magnitude of predicted impacts is judged to be of minor adverse significance in the context of this assessment, prior to mitigation measures being implemented. This is not expected to have an adverse effect on the health of human receptors.
- 6.154. It is considered that any adverse impact should be considered for mitigation and specific measures are to be put forward, where practicable. Mitigation measures considered may include modification of the project, compensation, and provision of alternative solutions, as well as pollution control where appropriate.
- 6.155. The proposed mitigation strategy is detailed in Sections 6.167 to 6.171.

Cumulative Effects

- 6.156. Cumulative effects are defined as those that occur as a result of current and future activities that may impact collectively over time. Cumulative effects on air quality at the Proposed Development are outlined in the following Sections. These sections consider the effect of the Proposed Development in conjunction with traffic associated with the identified committed developments listed in Appendix 2.

Construction Phase

- 6.157. A review of the MCC planning portal indicated there are a number of planning applications within 350 m of the Proposed Development, as listed in Appendix 2. As such, there is a likelihood for cumulative dust and road traffic effects should the construction phases of the committed developments overlap.
- 6.158. The implementation of the mitigation measures suggested in Table 6.21 will ensure that any impacts during construction is negligible on a temporary basis and therefore cumulative effects are considered not significant. It should be assumed that adjacent development sites will implement comparable dust control measures to reduce fugitive releases during construction activities.
- 6.159. With regards to cumulative road traffic impact during construction, the DM traffic data includes relevant operational traffic flows from each of the identified committed developments (see Table 6.20). As daily construction traffic generated by committed schemes is expected to be much lower than the operational traffic it is considered that impacts during construction phase have been assessed on a worse case basis.

Operational Phase

- 6.160. The assessment considered the effect of the Proposed Development in conjunction with the identified committed developments within Appendix 6.2. Associated traffic generation from the agreed baseline and cumulative developments were factored into the modelled traffic data to consider Type 2 effects from several committed developments and the Proposed Development.
- 6.161. The transport consultant has confirmed that potential traffic growth has been discussed with TfGM/MCC Highways and it was agreed no additional growth was necessary. This is on the basis of no noticeable traffic growth in recent years and a reduction in peak hour trips to the City Centre is in line with the City Centre Transport Strategy to 2040. Subsequently the future baseline scenario comprises 2022 traffic flows and committed development flows only.
- 6.162. All committed developments listed in Appendix 2 were reviewed to establish relevant schemes to be included within the air quality traffic flow data. Following consideration of the Transport Assessments for all schemes, only those developments which had potential to generate traffic across the air quality modelled road network and could combine with traffic generated by the Proposed Development were considered cumulatively. Furthermore, several of those committed schemes are predicted to generate very low or zero car trips which are unlikely to result in cumulative impacts across the modelling extents.
- 6.163. The schemes detailed in Table 6.20 have therefore been included on the basis that they have the greatest potential to result in cumulative effects across the modelling extents at sensitive locations.

Table 6.20 – Committed Developments

Planning Reference	Site Name
129273/FO/2021	Plot G, 34 Great Jackson Street
132199/FO/2021	Plot F, Great Jackson Street
126668/FO/2020	Crown Street Phase 2
132429/FO/2021	Trinity Islands
129273/FO/2021	Plot E, Great Jackson Street
123261/FO/2019	Arundel Street

- 6.164. It is understood that Plot 11 First Street has started on site, however a review of the accompanying ES chapter indicated the maximum 24-hour traffic generation as 152 AADT which marginally is above the EPUK and IAQM assessment threshold of 100 AADT. Importantly, the magnitude of change between the DM and DS scenarios was less than 0.5% at receptor locations modelled in this chapter.
- 6.165. This is considered to be a negligible increase and as such the consideration of operational phase traffic data associated with Plot 11 First Street would not affect the conclusions of this assessment.
- 6.166. No further committed developments were included within this assessment and are therefore not relevant to this Chapter.

Mitigation Measures

Construction Phase

- 6.167. The IAQM guidance provides a number of potential mitigation measures to reduce potential impacts from the construction phase. The EIA Site was classified as a major risk in regard to the potential of unmitigated dust soiling and moderate adverse risk in regard to human health resulting from unmitigated construction phase activities. It was identified that mitigation measures are required to reduce the associated risk to an acceptable level. Such mitigation measures have therefore been adapted for the EIA Site and summarised in Table 6.28.
- 6.168. It is recommended to review these measures prior to the commencement of construction works and incorporated into existing strategies. It should be noted that some or all of these measures may be used, dependent on the circumstances that arise.

Table 6.21 – Construction Phase – Dust Mitigation Measures

Activity	Control Measures
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the Site boundary • Develop and implement a stakeholder communications plan that includes community engagement • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dusty and air quality complaints • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Hold regular liaison meetings with other high-risk construction Sites that are within 500m of the Site boundary. Ensuring plans are co-ordinated and dust and particulate matter emission are minimised • Make complaints log available to LA when asked
Monitoring	• Undertake daily on- Site and off- Site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the LA when asked • Carry out regular Site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out
Preparing and Maintaining the Site	• Plan Site layout so that machinery and dust causing activities are located away from receptors • Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on Site. • Fully enclose Site or specific operations where there is a high potential for dust production and the Site as active for an extensive period • Avoid Site runoff of water or mud • Use water as dust suppressant where applicable • Keep Site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from Site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch off engines - no idling vehicles • Avoid the use of diesel or petrol-powered generators where practicable • Impose a signpost a maximum-speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas • Produce a Construction Logistics Plan to manage sustainable deliveries • Cover, seed or fence stockpiles to prevent wind whipping.
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure adequate water supply on the Site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights

Activity	Control Measures
	• Ensure equipment is readily available on Site to clean any spillages
Waste Management	• Avoid bonfires and burning of waste materials
Earthworks and Construction	• Re-vegetate earthworks and exposed areas • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate • Only remove the cover in small areas during work and not all at once • Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process • Ensure bulk cement and other fine powder materials are delivered and stored to prevent escape • For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving the Site are covered to prevent escape of materials • Inspect on- Site haul routes for integrity, instigate necessary repairs and record in Site log book • Install hard surfaced haul routes which are regularly damped down • If required, implement a wheel washing system at a suitable location near Site exit • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the Site exit, wherever Site size and layout permits • Access gates to be located at least 10m from receptors, where possible

Operational Phase

Onsite Impacts

6.169. Based on the dispersion modelling results, on-site annual or hourly mean pollutant concentrations meet the national AQO detailed in Table 6.1. Therefore, the exposure of new receptors is considered not significant and the EIA Site is considered suitable for end use without the requirement of protective mitigation measures, such as ventilation strategies.

Offsite Impacts

6.170. The overall impact significance with regards to operational phase impacts was determined as **minor adverse** on a permanent basis and there is a requirement to secure a reduction in pollution concentrations associated with road vehicle exhaust emissions. The following best practice measures are therefore proposed and will be implemented within the design of the Proposed Development:

- Up to 20% EVC provision on a demand led basis ; and
- 1 to 1 cycle provision per unit and additional cycle parking in the public realm for visitors

6.171. It is considered that the above measures are proportional to the nature and scale of the Proposed Development and will secure a reduction in development associated road vehicle exhaust emissions.

Residual Effects

6.172. Residual effects are defined as those that remain following the implementation of mitigation. Residual effects on air quality for the Proposed Development are outlined in the following Sections.

Construction Phase

6.173. Assuming the relevant mitigation measures outline in Table 6.24 are implemented, the residual effect from all dust generation activities is predicted to be negligible on a temporary basis. The IAQM guidance states that "For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation.

6.174. Implementation of the recommended measures will provide a residual effect that is considered to be 'not significant'.

Operational Phase

- 6.175. Impacts on NO₂ and PM concentrations associated with road traffic emissions generated by the operational phase were considered not significant at all sensitive receptor locations. This was determined using the EPUK and IAQM significance criteria as well as the application of professional judgment.
- 6.176. The implementation of offsetting measures, including electric vehicle charging points and cycle parking and the promotion of the uptake of low emission vehicles and sustainable transport methods, would ensure that the residual effects of road vehicle exhaust emissions generated during the operational phase remain as not significant.
- 6.177. The modelling also confirm that future occupants will not be exposed to unacceptable air quality and the EIA Site is deemed suitable for its proposed future use. Residual exposure impacts are therefore considered not significant.
- 6.178. Table 6.22 and Table 6.23 provide a summary of receptors, likely significant effects, mitigation measures, and residual effects during the Construction and Operational phases.

Table 6.22 – Construction Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect
Construction Phase				
Minor adverse effects from fugitive dust releases on human health and amenity	Existing Human Receptor Locations	Table 6.21 - the Proposed Development will incorporate the specific construction phase mitigation measures outlined in the IAQM guidance.	Implementation of recommended measures within a Construction Dust Management Plan (DMP) or Construction Environmental Management Plan (CEMP)	Negligible effects to property and people on a temporary basis
Minor adverse effects from road traffic emissions on human health	Existing Residential	Sustainable construction phase travel plan to reduce HGV movements during construction		Minor Adverse effects upon existing sensitive uses on a temporary basis

Table 6.23 – Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect
Operational Phase				
Negligible effects from existing road traffic emissions on human health	Proposed Human Residential Receptors	Not required	Not required	Negligible effects to future residents on a permanent basis
Minor adverse from additional road traffic emissions generated by the Proposed Development on human health	Existing Human Receptor Locations	Section 6.123 to 6.126: Proposed Development will consider a significant level of offsetting measures in the form of sustainable transport principles. The provision of EVC charging facilities (up to 20% provision demand led basis) as well as cycle parking facilities	Operational Mitigation Strategy	Negligible impact upon existing sensitive uses on a permanent basis

Monitoring

- 6.179. It is recommended that during the construction phase daily on-Site and off-Site manual inspections are undertaken, where receptors are nearby, to monitor dust soiling and compliance with dust management plans employed on the EIA Site. The frequency of site inspections should also be increased when activities with a high potential to produce dust are being carried out.
- 6.180. Specific air quality monitoring is not required during the operational phase. However, it is recommended that the uptake of Electric Vehicle Charging Points is audited on a regular basis. To ensure that the development is future proof, it is imperative that sufficient spaces are made available and where necessary provisions are increased to meet demand. It is also expected that the uptake of electric vehicles will increase year on year once the Proposed Development is operational.
- 6.181. This monitoring also applies to the provision of cycle spaces; however it is expected the current provision will be sufficient to meet maximum demand.

Reference List

- 6.182. This ES Chapter was prepared in reference to the following document and information sources:
- The National Planning Policy Framework, Ministry of Housing, Communities & Local Government, 2021
 - The National Planning Policy Framework (NPPF), Ministry of Housing, Communities & Local Government, 2021
 - The Air Quality Standards (Amendment) Regulations, England Directive 2008/50/EC, 2016.
 - Local Air Quality Management Technical Guidance 2022 LAQM.TG22, DEFRA, 2022.
 - The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007
 - Manchester's Local Development Framework, Core Strategy Development Plan Document, Manchester City Council, 2012
 - Greater Manchester Air Quality Action Plan 2016 – 2021, Transport for Greater Manchester and Greater Manchester Combined Authority, 2016.
 - Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014
 - Land-use Planning & Development Control: Planning for Air Quality - IAQM & Environmental Protection UK (EPUK) 2017
 - 2021 Air Quality Annual Status Report, Greater Manchester Combined Authority, June 2022.
 - <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>
 - <https://roadtraffic.dft.gov.uk/#6/55.254/-11.096/basemap-regions-countpoints>

7. Climate Change

Introduction

- 7.1. This Chapter of the ES has been prepared by WSP and assesses the likely GHG emission related 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 effects and the likely residual effects after these measures have been adopted.
- 7.2. This Chapter is not accompanied by any technical appendices.
- 7.3. The author of the chapter has M. Plan (Environment) degree and has experience in preparing Climate Change Chapters for EIA developments of 3 projects to date.

Assumptions and Limitations

- 7.4. The assumptions made in the assessment and the potential limitations include:
- 7.5. The operational phase of the development is assumed to vary for different parts of the development. **Table 7.2** describes the operational phase considered in this assessment for each part of the development, based on the construction programme provided. The expected lifespan of the development has been assumed to be 60 years.
- 7.6. A lifecycle assessment (LCA) has previously been undertaken for a typical Renaker residential tower, specifically the C1 tower of Trinity Islands development (Planning Permission Ref: 132429/FO/2021). The LCA was conducted using bill of quantity (BoQ) data (material specifications and quantities) and using the LCA software, OneClick.
- 7.7. For the Proposed Development, at the time of conducting the assessment, BoQ data was not available. As the Trinity Islands C1 tower is of a similar scale, form/design and construction methodology, it was deemed appropriate to use the outputs of the Trinity Islands development LCA and pro-rata the data based on Gross Internal Floor Area of the Proposed Development (towers E1, E2, C7, C8 and D) to estimate the whole life embodied emissions. A similar approach was taken from Plot F towers F1 and F2 (Planning Permission Ref: 132429/FO/2021).
- 7.8. It should be noted that the assessment for the Proposed Development is a conservative estimate utilising estimated quantities and generic material data, in combination with IStructE carbon tool results for the structural aspects of all the Proposed Development towers; accordingly, the approach adopted is intended to consider a worst case scenario results. Adverse impacts would, therefore, be expected to reduce as more project specific, detailed and accurate information is made available during the later design stages.
- 7.9. The assessment of operational building emission takes into consideration national grid decarbonisation to 2050. This is because the Proposed Development has followed an all-electric approach, so it will be in a position to benefit from the decarbonisation of the electricity and gradually reduce its operational building emissions over time (even where energy consumption remains the same). To account for this benefit, but whilst also applying a conservative approach, the electricity emission factor used in this assessment is the average of the electricity emission factors for the period 2028-2087, and based on the emissions factors published by UK Government **[1]**.
- 7.10. Future improvements to vehicle fuel efficiency and electrification have not been considered in the assessment, as the data is not available at this stage. It is anticipated that the phasing out of petrol and diesel vehicles from 2030 **[2]**, future technological development and changes in trip numbers are likely to result in reduced emissions in contrast to those used in the assessment.
- 7.11. Due to limitations in the availability of data, operational carbon emissions for the existing baseline have not been included in this stage of the assessment.
- 7.12. The significance of effects determined in this GHG assessment are based on the current design and carbon emission estimates, as compared to industry benchmarks. The design has the potential to change at subsequent stage and mitigation measures for reducing carbon emissions from the Proposed Development should be considered at further design stages.

- 7.13. The assessment will not consider any specific Committed Developments in addition to the Proposed Development because - as GHGs are not spatially contained - the assessment already considers the cumulative effect of all GHGs that could contribute to climate change. Therefore, the assessment of the GHG due to the Proposed Development implicitly assesses the cumulative effect of GHG emissions and contextualises these against the UK Carbon Budgets and RIBA 2030 Climate Change targets. For this reason, the ES Chapter will not consider a standalone cumulative scenario.
- 7.14. The calculated figures with regards to carbon emissions represents the data available at the time of submission and reflect the design of the buildings are at RIBA stage 2 to 3. Therefore, whilst it's expected that the predicted carbon emissions are conservative and therefore they will improve through design development, they are estimates and as such can go up as well as down. Significant improvement of these figures will rely on commercially viable technological advancements in the manufacturing of basic construction materials and efficiency of plant/machinery in the coming years. The RIBA 2025 benchmark is expected to be achieved or improved upon but this is subject to aforementioned variables.

Legislative and Policy Context, Guidance

- 7.15. The applicable legislative context for the GHG assessment of the Proposed Development is now described.

Legislation

7.16. **Climate Change Act 2008 (2050 Target Amendment) Order 2019 [3]**

The Climate Change Act 2008 sets targets for reducing the UK's impacts on climate change and the need to prepare for managing the impacts. The Act sets a target of 80% carbon dioxide (CO₂) emissions reduction by 2050 (against a 1990 baseline) and sets interim targets to ensure progress towards this target. The Act also requires a Climate Change Risk Assessment (CCRA) to be used to assess the risks from the impact of climate change to the UK.

The first CCRA in the UK was presented to Parliament in an Evidence Report in 2012, with the second presented in 2017. The overall aim of the Report was to assess the urgency of further action to tackle current and future risks, and realise opportunities, arising for the UK, from climate change.

The Act also requires the production of a national adaptation plan for the UK Government to implement to be ready for the challenges of climate change and a variety of organisations with key responsibilities (i.e., deemed to have adaptation reporting powers, ARP), were required to submit an ARP report of the steps they were and are taking to prepare for climate change.

7.17. **Planning and Energy Act 2008 [4]**

The Planning and Energy Act 2008 enables local planning authorities in England and Wales to set requirements for energy use and energy efficiency by including policies in local plans imposing reasonable requirements for the use of energy from renewable sources and low carbon energy. The Act enables local planning authorities to ensure that development in the area complies with energy efficiency standards.

7.18. **Carbon Budgets 2021 [5]**

Carbon budgets place restrictions on the amount of GHG emissions the UK can emit over a five-year period. The UK is the first country to set legally binding carbon budgets. Every tonne of human induced GHG emitted between now and 2050 will be counted towards the budget. If emissions rise in one sector, the UK will have to reduce emissions in another sector to balance the budget.

7.19. **The Carbon Plan: Delivering our Low Carbon Future, 2011[6]**

The Plan sets out how the UK will achieve decarbonisation within the framework of its energy policy to make the transition to a low carbon economy while maintaining energy security and minimising costs to consumers, particularly those in the poorer households. The document envisions to cut emissions from various sectors including buildings, transport, industry, electricity, and agriculture through greater energy efficiency and use of low carbon technology.

National Planning Policy

7.20. **National Planning Policy: National Planning Policy Framework 2021 [7]**

The National Planning Policy Framework (NPPF) 2021 sets out the Government's planning policies for England and how these are to be applied. Guidance relating to the reduction of greenhouse gases is mainly set out in Section 14 "Meeting the Challenge of Climate Change, Flooding and Coastal Change". Within paragraph 8, the document confirms that the purpose of the planning system is to contribute to the achievement of sustainable development, which includes economic, social, and environmental dimensions. The main relevant policies are set out in paragraphs 8, 20, 148, 150 and 154 which all support the reduction of greenhouse gas emissions.

Local Planning Policy

7.21. Manchester Local Development Framework [8]

The Manchester Local Development Core Strategy was adopted by Manchester City Council in 2012, which covers a period of 15 years from 2012 to 2027. It describes Manchester today and outlines the Council's vision for Manchester in 2027 along with the planning policies which will be used to deliver that vision. In addition to the carbon targets for 2020-25 according to the strategy, the council also has a target to reach zero carbon by 2038. This means reducing direct emissions by 95% by 2038 (compared to a 2015-16 baseline).

Guidance

7.22. Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA) 2022 [9]

The aim of this guidance is to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and nonstatutory Environmental Impact Assessment (EIA). This guidance has been prepared to assist EIA practitioners to take an informed approach to the treatment of GHG emissions within an EIA. It sets out areas for consideration at all stages of the assessment.

7.23. RIBA 2030 Climate Change Targets, Version 2 (2021) [10]

RIBA has developed the 2030 Climate Challenge to help professionals design within a climate conscious trajectory. The 2030 Climate Challenge provides a stepped approach towards reaching net zero and sets a series of targets for practices to adopt to reduce operational energy, embodied carbon, and potable water related emissions.

7.24. RICS guidance on Whole Life Carbon Assessment for the Built Environment (2017) [11]

7.25. The RICS guidance mandates a whole life approach to reducing carbon emissions within the built environment. Specific objectives of this professional statement include providing a consistent whole life carbon assessment implementation plan and reporting structure for built projects, and promoting the reliability of whole life carbon assessments by acting as a solid reference for the industry, primarily for the UK.

Assessment Methodology and Significance Criteria

Assessment Methodology

- 7.26. This assessment aligns with best practice approaches to carbon assessment in EIA. Current best practice is established in 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance IEMA (2022)'. This guidance advocates an approach where GHG emissions are always considered and reported, but at varying degrees of detail depending on the EIA and the project in question.
- 7.27. In line with the guidance, this chapter sets out the methodological approach that has been taken to assess GHG emissions associated with the Proposed Development. This means providing the assessment approach, calculating the baseline, determining the significance of each GHG emission source scoped into the assessment and setting out recommended strategies for mitigation.
- 7.28. Existing sources of GHG emissions prior to construction and operation of the Proposed Development (i.e., without development) are identified – where available - to establish the current baseline. Sources of GHG emissions following the construction and during operation of the Proposed Development are then assessed, from which the significance, mitigation measures and residual effects are determined.
- 7.29. To assess the significance of effects of the Proposed Development on climate, the following emissions have been considered:
- **Whole life embodied carbon emissions:** This includes embodied carbon emissions related to materials and construction process throughout the lifespan of the building, including upfront emissions during construction, construction transport emissions, emissions from replacements/repairs during the operational phase, and end-of-life emissions;
 - **Operational carbon emissions (from energy):** This includes carbon emissions related to the energy consumption throughout the operational phase of the development; and
 - **Operational transport emissions:** This includes emission related to the transport, throughout the operational phase of the project.

Construction Phase

Whole Life Embodied Carbon Emissions (Stage A1 to A5)

- 7.30. The scope of whole life embodied carbon emissions includes lifecycle modules A1-3 (Materials and products); A4 (transport of materials and products to construction site); A5 (Construction site impacts); B1-B5 (Maintenance and replacement) and C1-C5 (end-of-life disposal).
- 7.31. An assessment of the whole life embodied emissions has been undertaken using the same methodology adopted for Plot F Towers F1 and F2. This assessment refers to a typical Renaker residential tower, specifically the C1 tower of Trinity Islands development. C1 tower is a similar development to the Proposed Development (towers C7, C8, E1, E2 and D) in terms of scale, material quantities and material specifications; it is therefore considered to be an appropriate reference for this assessment.
- 7.32. However, an assessment on the structural elements of substructure and superstructure for Towers C8, E1 and D have been calculated within the IStructE tool by structural engineers DP Squared LTD. The structural quantities for Tower C7 and E2 are specified to be the same as Tower C8 and Tower E1 respectively by the structural engineers DP Squared LTD. Therefore, these elements have been substituted out of Tower C1 quantities, and – instead – the structural quantities provided by DP Squared were used.
- 7.33. The GHG results of the assessment for Tower C1 of Trinity Islands were converted to GHG per sq m of the GIA ($\text{kgCO}_2\text{e/m}^2$) and then multiplied with the GIA of Phase 3 and Plot D towers to populate the GHG results for the Proposed Development.
- 7.34. For the non-domestic part (Plot D office), as no structural IStructE data was available at the time of the assessment, the GHG results of the assessment for Tower C1 of Trinity Islands were converted to GHG per sq m of the GIA ($\text{kgCO}_2\text{e/m}^2$) and then multiplied with the GIA of the Plot D office to populate the GHG results estimate for it.
- 7.35. The analysis has been carried out to align with the requirements of RICS Professional Statement “Whole Life Carbon Assessment for the Built Environment” (2017). The approach to the assessment covers the ‘cradle to grave’ stages of the building lifecycle, including A1-3 Product stage, A4-5 Construction process stage, B1-5 Use stage and C1-4 End of life stage.
- 7.36. The LCA tool ‘OneClickLCA’ has been used to source carbon databases and perform LCA calculations. The OneClickLCA tool utilised is the ‘Carbon assessment, RICS’, and construction materials were selected from the associated database.
- 7.37. The building elements included in the scope of the assessment are aligned with the ‘Embodied Carbon Target Alignment’ work (2021) and RICS Professional Statement “Whole Life Carbon Assessment for the Built Environment” (2017). Elements 1-Substructure and 2-Superstructure were substituted out of the C1 Tower quantities, and the IStructE carbon emission quantities provided for the concrete elements of Towers C8, E1 and D were used for the assessment. The elements 3-Finishes, 4-FF&E, 5-Services and 8-External works were added as separate % allowances of the A1-5 and B-C embodied emissions, based on data from GLA’s Whole Life Carbon (WLC) Guidance (Consultation version, Oct 2020). This is an acceptable approach for the concept design stage where such detailed material quantities and specifications are not yet available for all the in-scope building elements.
- 7.38. The RIBA has developed targets for embodied carbon, operational energy, and water use. These consider the latest recommendations from the Green Construction Board and have been developed by the RIBA in consultation with other UK professional bodies. Similarly, The Embodied Carbon Target Alignment document developed by LETI in consultation with industry groups, including CIBSE, RIBA, IStructE, and the GLA outlines total embodied carbon targets, as well as upfront carbon targets. These targets (summarised in Table 7.1 and Figure 7.1) are progressive yet realistic, and a vital first step to ensure the construction industry has delivered the significant reductions necessary by 2030 in order to have a realistic prospect of achieving net zero carbon for the whole UK building stock by 2050.
- 7.39. The carbon emissions (CO_2e) associated with transportation used during the construction stage were calculated as part of the whole life embodied carbon emissions.

Table 7.1 – RIBA Sustainable Outcome Metrics

RIBA Sustainable Outcome Metrics	Business as usual (New Build, compliance approach)	2025 Targets	2030 Targets
Domestic			
Embodied Carbon $\text{kgCO}_2\text{e/m}^2$	1,200	<800	<625
Non-domestic (new build offices)			
Embodied Carbon $\text{kgCO}_2\text{e/m}^2$	1,400	<970	<750

Figure 7.1 - RIBA Climate Challenge Targets

Life Cycle Embodied Carbon, A1-5, B1-5, C1-4				
Band	Office	Residential (6+ storeys)	Education	Retail *
A++	<150	<150	<125	<125
A+	<345	<300	<260	<250
A	<530	<450	<400	<380
B	<750	<625	<540	<535
C	<970	<800	<675	<690
D	<1180	<1000	<835	<870
E	<1400	<1200	<1000	<1050
F	<1625	<1400	<1175	<1250
G	<1900	<1600	<1350	<1450

RIBA (2030 Target) A++

RIBA (2025 Target) A+

RIBA (2021 Good Practice) A

RIBA (BAU) E

LETI (2030 Design Target) A

LETI (2020 Design Target) C

Operational Phase

- 7.40. The operational phase of the Proposed Development is assumed to start from 2027 (varying for each part of the development) following the completion of the construction and commissioning phases. Since the expected lifespan of developments of this nature are typically assumed to be 60 years, then the operational part of the assessment covers the following periods for each part of the development detailed in Table 7.2.

Table 7.2 - Operational Phase of different parts of the Proposed Development

Name	Operational Phase
Towers C7 and C8	2031 to 2090
Towers E1 and E2	2029 to 2088
Tower D	2032 to 2091
Plot D Office Building	2027 to 2086

- 7.41. The assessment of significance of the effects from emissions from the operation of the buildings and transport, is undertaken on an annual basis. The results for critical climate period of the above-mentioned phases are also provided for the Proposed Development on a contextual basis, covering the whole life of the Proposed Development (60 years).

Embodied carbon Emissions (Stage B1 to B5)

- 7.42. For embodied emissions from the replacement/refurbishment of building parts during use stage, the same procedure (as described in paragraphs 7.31 to 7.367.33) has been followed. The RICS assumptions on material and building component lifespans have been used for this assessment.
- 7.43. To assess the magnitude of impact for this effect, a comparison with the RIBA targets for whole life embodied carbon (including construction, operation, and end-of-life phase) has been completed.

Operational Energy Emissions

- 7.44. The energy consumption figures for both domestic and non-domestic typologies (in Phase 3 and Plot D) have been provided by Element Sustainability and Futureserv and have been used for the operational carbon emission calculations.
- 7.45. The RIBA benchmarks for annual operational energy consumption are stated in Table 7.3. Carbon emissions from operational energy use are assessed over the whole expected life (60 years) of the Proposed Development. While calculating the carbon emissions from operational energy use, the decarbonisation of grid electricity has been considered. This has been done by using the average predicted annual carbon factors for grid electricity, based on emissions factors published by the UK Government. These emission factors consider grid decarbonisation to 2050, and therefore the carbon emissions from grid electricity remain consistent from 2050 until 2100.

Table 7.3 - RIBA targets: Domestic and Non-Domestic

RIBA Sustainable Outcome Metrics	Business as usual	2025 Targets	2030 Targets
Domestic			
Operational energy kWh/m ² /yr	120	<60	<35
Non Domestic (New build offices)			
Operational energy kWh/ m ² /yr	130	<75	<55

Operational Transport Emissions

- 7.46. To calculate the operational traffic emissions associated with the Proposed Development, the number of trips per vehicle/transport mode, and the average trip distance have been multiplied by emissions factors for each key vehicle type. The data required was provided by Curtins and aligns with the Transport Assessment. The 2022 Defra emissions factor selected for each vehicle type represents the closest match. This is summarised in Table 7.4 **Error! Reference source not found..**

Table 7.4 - Transport Emissions Calculation Methodology

Metric	Unit	Personal Vehicle	Transport Mode
Total Distance (A)	km/year	A=CXD	A=BXD
Total Person Trips (B)	people trips/year	-	B
Total Vehicle Trips (C)	vehicle trips/year	C	-
Average Trip Length (D)	km/trip	D	D
Emissions Factor Value (E)	kgCO ₂ e/km	E	E
Total (T)	kgCO ₂ e	T=EXA	T=EXA

- 7.47. The use of electric vehicles has been assessed based on the traffic data on personal vehicles provided by Curtins; these data confirm that up to 20% of the total parking spaces will provide active EV charging infrastructure. These will be provided on a demand lead basis through the apartment sales process. Further details are included in the mitigation section of this chapter.

EOL Phase

Embodied Carbon Emissions (Stage C1 to C4)

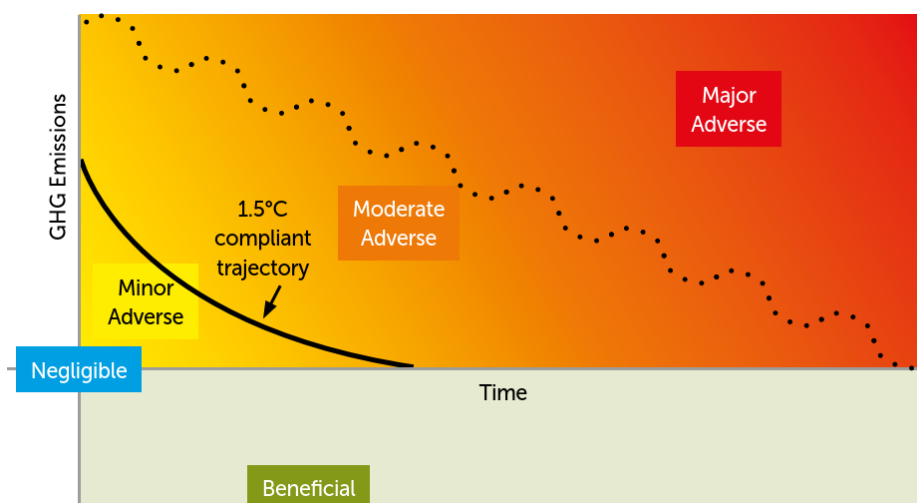
- 7.48. For end of life embodied emissions, the procedure described in paragraphs 7.31 to 7.36 has been applied.
- 7.49. To assess the magnitude of impact for effects at end of life, a comparison with the RIBA targets for whole life embodied carbon (including construction, operation and end-of-life phase) has been conducted.

Significance Criteria

7.50. With regards to assigning significance, the 2nd edition of the IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance, February 2022 [9], provides five distinct levels of significance. These levels are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero. Specifically, when considering the aspect of significance, IEMA guidance on GHG assessment states:

“When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project’s emissions should therefore be based on its net impact over its lifetime, which may be positive, negative, or negligible...” and;

“.... The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.”



7.51. The different levels of significance defined in the IEMA guidance are explained in Table 7.5.

Table 7.5 - Levels of Significance IEMA

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

- 7.52. As per the IEMA guidance [79, “Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant”.
- 7.53. Contextualising the GHG emissions from a project helps to determine whether it supports or undermines the UK’s trajectory towards net zero. IEMA guidance further suggests that “It is down to the practitioner’s professional judgement on how best to contextualise a project’s GHG impact”.
- 7.54. Therefore, apart from the RIBA 2030 Climate Change targets (2021) [10] described in Table 7.1 and Table 7.3, the carbon emissions of the Proposed Development will also be compared to the UK Carbon Budgets [5] as described in Table 7.6.

Table 7.6 - UK National Carbon Budgets

Carbon Budget Period	UK Carbon Budget (MtCO ₂ e)
Third: 2018-2022	2,544
Fourth: 2023-2027	1,950
Fifth: 2028-2032	1,725
Sixth: 2033-2037	965

- 7.55. Based on this contextualisation and professional judgement, the overall significance of effect of the Proposed Development will be defined as outlined in Table 7.7, in accordance with the RIBA targets described in Table 7.1 and Table 7.3.

Table 7.7 - Significance of Effect

Significance of effect	Description
Negligible magnitude of impact	Where the Proposed Development is below the “2030 Targets” for the embodied carbon and operational energy performance respectively defined by the RIBA guidance.
Minor magnitude of impact	Where the Proposed Development is between the “2025 Targets” and the “2030 Targets” for the embodied carbon and operational energy performance, respectively, defined by the RIBA guidance
Moderate magnitude of impact	Where the Proposed Development is between the “Business as Usual” and the “2025 Targets” for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance.
Major magnitude of impact	Where the Proposed Development exceeds the “Business as Usual” for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance.

Scenarios Tested

- 7.56. For this technical chapter, Scenario 7 (Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6), as mentioned in the EIA Briefing Note, will be tested as the worst-case scenario. Please refer to Table 7.8 for further details.

Table 7.8: Scenario 7 Constituents

Scenario 7 constituents	Description
Baseline	Existing site
Phase 2 + Phase 3 + Phase 4 + Phase 5	Plot E2, Plot E1, Plot C8, Plot C7 (Proposed Residential use)
Phase 1 + Phase 6	Plot D (Proposed Office and Residential use)

The Study Area

- 7.57. The GHG emissions assessment has not been restricted by geographical area, but has, instead, been established to include any increase or decrease in emissions because of the Proposed Development, wherever that may be. This comprises:
- **Construction stage** embodied carbon emissions (as per stages A1-A5 of PAS 2080) [12] associated with the transport of materials to and from the Site and their manufacture, in addition to the disposal of the building elements during construction.
 - **Operational stage** embodied carbon emissions (as per stages B1-B9 of PAS 2080) associated with the replacement/refurbishment of building parts, emissions associated with the buildings' energy use, including but not limited to: electricity, heating and lighting.
 - **Operational stage** transport emissions arising from the use of the Proposed Development, as well as the surrounding regional road network to gain access to the Site, would also fall under operational emissions, in addition to any shifts in transport modes/patterns which may result.
 - **End of life stage** embodied carbon emissions (as per stages C1-C4 of PAS 2080) associated with decommissioning works as well as from transport, processing, and disposal of materials during this phase.
- 7.58. With regards to various building types on the Proposed Development Site, the GHG assessment considers both the domestic (residential) and non-domestic (office and amenity) areas.

Source of Effect

- 7.59. In accordance with guidance from the IEMA, the emissions sources for the Proposed Development (also described as 'elements'), alongside their associated Lifecycle Stage as derived from Publicly Available Specification (PAS 2080), have been identified in Table 7.9.

Table 7.9 – Likely Emission Sources in the proposed development

Lifecycle Stage (As per PAS 2080)	Element	Likely Source of emission
Construction Phase	Product stage (manufacture and transport of raw materials to suppliers) (A1-3)	Embodied emissions associated with extraction and manufacturing of the required raw materials.
	Transport of materials to site (A4)	Emissions from fuel and electricity used in vehicles transporting materials to site.
	Plant and equipment used during construction (A5)	Emissions from fuels and electricity used in plant and equipment on site.
	Transport of waste (A5)	Emissions from fuel/energy used in vehicles transporting materials away from site.
	Disposal of waste (A5)	Emissions from the final disposal of waste materials.
Operational Phase	Operation (B1)	Embodied emissions, and emissions associated with electricity use for lighting.
	Maintenance (B2)	Embodied emissions, and emissions from transport and plant associated with maintenance.
	Repair (B3)	Embodied emissions, and emissions from transport and plant associated with repair.
	Replacement (B4)	Embodied emissions and emissions from transport and plant associated with replacement.

Lifecycle Stage (As per PAS 2080)	Element	Likely Source of emission
	Refurbishment (B5)	Embodied emissions and emissions from transport and plant associated with refurbishment.
	Operational Energy Use (B6)	Emissions resulting from the energy used, e.g., heating and cooling, ventilation, lighting, and the combustion of gas.
	Operational Water Use (B7)	Emissions from the use of water required by infrastructure to enable it to operate and deliver its service.
	Other operational processes (B8)	Carbon emissions arising from infrastructure to enable it to operate and deliver its service including management of operational waste.
	User's utilisation (B9)	Represents the activities associated with user's utilisation of the infrastructure during the use stage.
End of life	Decommissioning process (C1)	Emissions from decommissioning work (i.e., fuel/electricity).
	Transport and disposal of materials (C2-C4)	Emissions sources as fuel/energy consumption from the transport of materials to disposal sites or recovery.

Of the elements described in **Table 7.9**, those scoped in or out, have been listed in **Table 7.10**.

Table 7.10 - Scoped in and scope out emission sources or elements

Receptor	Element	Description of Potential Effect	Applicable Development Phase (C/ O/ EOL)	Scoped In / Out
Global Climate	Product stage (manufacture and transport of raw materials to suppliers) A1-A3	Raw materials required for the Proposed Development will result in embodied emissions and have the potential to be significant.	C	In
	Transport of materials to site A4	Construction stage emissions from fuel / energy consumption due to the delivery of material to site have the potential to be significant.	C	In
	Plant and equipment use during construction A5	Fuel / energy consumption of plant and equipment used during construction would generate GHG emissions.	C	In
	Disposal of waste A5	Emissions from the disposal of waste are unlikely to be significant, due to a large proportion of construction waste being inert. This includes the waste from the demolition of existing assets.	C	Out
	Replacement and refurbishment B4	Replacement and refurbishment activities on the Proposed Development would release a potentially significant magnitude of emissions	O	In
	Operational Energy Use B6	Emissions will be released from the heating, cooling, ventilation, domestic hot water, lighting, and auxiliary systems for constructed buildings.	O	In

Receptor	Element	Description of Potential Effect	Applicable Development Phase (C/ O/ EOL)	Scoped In / Out
	Operational Water use B7	Emissions due to water usage during the operation phase are unlikely to be significant.	O	Out
	End-user emissions (regional traffic flows) – Traffic B9	Changes to regional traffic flows are expected and this has the potential to result in a significant adverse effect on GHG emissions.	O	In
	In-use Emissions B1	B1 refers to Carbon emissions released from building elements and the impact of potential carbon absorption. This is not anticipated to be a significant emission source.	O	Out
	Maintenance B2	Maintenance associated with the Proposed Development is not considered to be a significant emissions source, by comparison with that which already takes place within the region.	O	Out
	Repair B3	The Proposed Development is designed to be maintained rather than repaired, therefore subsequent repair emissions sources are not considered to be material to the assessment.	O	Out
	Other operational processes (B8)	Carbon emissions arising from infrastructure to enable it to operate and deliver its service including management of operational waste.	O	Out
	Decommissioning process C1-C4	Emissions are likely to arise from decommissioning, stripping out, disassembly, deconstruction, and demolition operations as well as from transport, processing, and disposal of materials at the end of life of the Proposed Scheme.	EOL	In

C: Construction, O: Operation, EOL: End of Life

Baseline Conditions

- 7.60. In the baseline scenario, GHG emissions occur constantly and widely as a result of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change. The GHG assessment only considers instances in which the Proposed Development results in additional or avoided emissions in comparison to the baseline scenario and its assumed evolution.

Existing Baseline

- 7.61. The current site includes Crown Street Phase 3 (partial Plot C and E) and Plot D. The Crown Street Phase 3 application site comprises the Renaker Marketing Suite, Manchester Carers Forum (Gaddum House) and other surrounding cleared site. Plot D includes a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete. Thus, existing uses within the site comprise of light industrial units, office use, as well as residential and retail uses.

7.62. As per the transport assessment undertaken by Curtins, Table 7.11 depicts the annual operational transport emissions for the existing baseline scenario and is estimated to be **663,419 kgCO₂e/year**. The vehicle distances provided by Curtins are based on standard dataset obtained from the Department for Transport, which does not take into account local activity such as the adjacent concrete batching plant, thus, this assessment takes into account the worst-case scenario.

Table 7.11 - Existing baseline for transport emissions for all vehicles

Metric	Unit	Car (Petrol)	Car (BEV)	Car (PHEV)	Car (Hybrid)	LGV	LGV (EV)	OGV
Total distance	km/year	983,413	11,806	9,835	28,524	480,614	3,068	762,870
Total vehicle trips	vehicle trips/yr	95,292	1,144	953	2,764	8,146	52	12,930
Total passenger trips	Passenger trips/yr	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average Trip length	km/trip	10.32	10.32	10.32	10.32	59.00	59.00	59.00
Emissions factor description	kgCO ₂ e/km	Average car, petrol, per km	Average car, battery electric vehicle, per km	Average car, Plug in Hybrid Electric Vehicle, per km	Average car, Hybrid, per km	Average van (<3.5 tonnes), unknown fuel, per km	Average van (<3.5 tonnes), Battery EV, per km	Diesel HGV, Rigid (3.5-7.5 tonnes), Average laden, per km
Emissions factor value	kgCO ₂ e/km	0.1705	0.0514	0.0935	0.1200	0.2310	0.0623	0.4584
Total	kg CO ₂ e /year	167,672	607	919	3,424	111,017	191	349,661
Total Emissions	kgCO ₂ e/year	663,419						
Total Emissions	tCO ₂ e/year	663						

- 7.63. Since the Proposed Development is not a greenfield development, the existing baseline will have operational emissions (from, but not limited, to heating, cooling, lighting and electricity) from the existing buildings at site. However, due to lack of available data in this context, it has not - at this stage - been possible to include operational carbon emissions in the existing baseline. Furthermore, the emissions from existing operational energy emissions are not likely to have any significant influence on the baseline.

Future Baseline

- 7.64. In this assessment, the future baseline scenario has been assumed to be the same as existing baseline.

Identification and Evaluation of Likely Significant Effects

Assessment of GHG Emissions

Sensitive Receptors

- 7.65. The sensitive receptor relevant to this assessment is the **global climate**, as impacted by the generation and release of GHG emissions.

Construction Phase

Embodied Carbon Emissions (Stage A1 to A5)

- 7.66. Activities during the construction phase would generate GHG emissions, particularly from the manufacturing of the construction materials, but also from transport of these materials to the construction site and from on-site works.
- 7.67. The Proposed Development includes the Crown Street Phase 3 site (partial plots C and E), where four residential towers (C7 and C8 of 51 storeys each; E1 and E2 of 47 storeys each) are proposed with flexible commercial use on ground floor, and the Plot D site, where a 71-storey residential tower D as well as a separate 4 storey office building is proposed. With reference to the assumptions and methodology discussed in paragraphs 7.6 and 7.31, the results are captured in Table and Table which show the whole life embodied carbon emissions from the Proposed Development.

Table 7.12 - Embodied and transport carbon emissions during construction phase (domestic and non-domestic)

Building use	Total whole life embodied carbon of the Proposed Development (tCO _{2e})				
Domestic and flexible comemrical spaces (Towers C7, C8, E1, E2, D)	C7	C8	E1	E2	D
Emissions related to A1-A3 Product Stage	19,177	19,204	21,162	20,986	39,160
Emissions related to A4 Transport to Site	839	840	923	917	1,810
Emissions related to A5 On-site construction works	1,880	1,885	2,137	2,105	3,379
Total A1 to A5	21,896	21,929	24,221	24,009	44,348
Total A1 to A5 (all towers)	136,403				

Table 7.13 - Embodied and transport carbon emissions during construction phase (non domestic)

Building use	Total whole life embodied carbon of the Proposed Development (tCO _{2e})
Non-Domestic (Plot D Offices)	
Emissions related to A1-A3 Product Stage	1,062
Emissions related to A4 Transport to Site	36
Emissions related to A5 On-site construction works	131
Total A1 to A5	1,228

- 7.68. The total whole life embodied carbon emissions for the Proposed Development for stage A1 to A5 are estimated to be **137,632 tCO₂e**. Of this, **136,403 tCO₂e (99%)** are from domestic and flexible commercial space use; **1,228 tCO₂e** are from solely non-domestic (office) uses.

Operational Phase

Embodied Carbon Emissions (Stage B1 to B5)

- 7.69. Activities during the operational phase would generate GHG emissions, particularly from the replacement and/or refurbishment of building elements.
- 7.70. The calculations for the embodied carbon emissions generated during the operational phase are provided in **Table** and **Table**.

Table 7.14- Calculations for the embodied carbon emissions during operation (Domestic+Non-Domestic)

Type (Domestic)	Carbon emissions (tCO ₂ e)				
Domestic- Residential Towers_flexible commercial spaces	C7	C8	E1	E2	D
Emissions related to B1-5 - Use Stage	10,069	10,099	11,097	10,903	17,611
Total B1-5 Use Stage Emissions	59,778				

Table 7.15 - Calculations for the embodied carbon emissions during operation (non domestic)

Type (Non-Domestic- Office)	Carbon emissions (t CO ₂ e)
Emissions related to B1-5 - Use Stage	620

- 7.71. The total tonnes of embodied carbon estimated to be generated during operational phase by the Proposed Development is **59,778 tCO₂e** for the domestic and flexible commercial space part of the development and **620 tCO₂e** for the non-domestic (office) components.

Operational Energy Emissions

- 7.72. The Proposed Development comprises domestic as well as non-domestic areas (office, amenity and retail areas).
- 7.73. To determine the operational energy emissions for the domestic building typologies, the energy consumption of typical floorplates in kWh/m²/yr provided by Element Sustainability and Futureserv has been used.
- 7.74. For the non-domestic new-build office spaces, retail units and amenity areas, the energy consumption in kWh/m²/yr is - similarly - taken from the data provided by Element Sustainability and Futureserv and has been used for the operational energy emission calculation.
- 7.75. **Table**, **Table** and **Table** give the annual operational energy use for the Proposed Development with respect to the domestic and non-domestic (amenity areas, retail areas and office) building typologies.

Table 7.16 - Operational building energy consumption and GHG emissions – annually (Domestic)

Building Use (Domestic)	Energy Consumption (kWh/m ² /yr)	NIA of the Proposed Development (m ²)	Total annual operational energy for the Proposed Development (kWh/yr)
Domestic (Tower C7, C8)	62.71	56,064.00	3,515,773
Domestic (Tower E1, E2)	59.30	61,978.40	3,675,319
Domestic (Tower D)	57.40	43,800.75	2,514,136
Average Energy Consumption (kWh/m²/yr)	60.28		
Total Energy Consumption (kWh/yr)			9,705,256

Table 7.17 - Operational building energy consumption and GHG emissions – annually (Non-Domestic- Amenity & Retail Areas)

Building Use (Non- domestic) Amenity and Retail Areas	Energy Consumption (kWh/m2/yr)	NIA of the Proposed Development (m2)	Total annual operational energy for the Proposed Development (kWh/yr)
Non-domestic Amenity Zones (Towers C7, C8)	Varied due to multiple energy consumption numbers	6,361	391,632
Non-domestic Amenity Zones (Towers E1, E2)	Varied due to multiple energy consumption numbers	6,954	294,483
Non-domestic Amenity Zones (Towers D)	Varied due to multiple energy consumption numbers	6,372	420,451
Non-Domestic Retail units (Tower C7, C8)	Varied due to multiple energy consumption numbers	377	20,743
Non-Domestic Retail units (Tower E1, E2)	Varied due to multiple energy consumption numbers	602	33,158
Average Energy Consumption (kWh/m2/yr)	56.06		
Total Energy Consumption (kWh/yr)			1,160,468

Table 7.18 – Operational building energy consumption and GHG emissions – annually (Non-Domestic- Office)

Building Use (Non- domestic)	Energy Consumption (kWh/m2/yr)	NIA of the Proposed Development (m2)	Total annual operational energy for the Proposed Development (kWh/yr)
Non-domestic (Plot D Marketing suite and Offices)	65.98	2,664	175,824

- 7.76. The total annual energy consumption from energy use for domestic part of the Proposed Development is estimated as approx. **9,705,256 kWh/yr**. For the non-domestic part (amenity and retail areas) of the development, the total annual energy use is estimated as **1,160,468 kWh/yr**. For the non-domestic part (offices) of the development, the total annual energy use is estimated as **175,824 kWh/yr**. The overall total annual energy consumption rate of the Proposed Development is estimated to be approx. **11,041,547 kWh/yr**. The total operational energy use over the 60-year expected life of the Proposed Development is estimated to be **662,493 MWh**.
- 7.77. Carbon emissions from operational energy use are assessed over the whole expected life (60 years) of the Proposed Development. While calculating the carbon emissions from operational energy use, the decarbonisation of grid electricity has been considered. This has been done by using the average predicted annual carbon factors for grid electricity, based on data published by the UK Government. These emission factors for grid electricity consider grid decarbonisation, and therefore the carbon emissions from grid electricity continue to remain consistent from 2050 until 2100.
- 7.78. The total tonnes of operational carbon emissions predicted to be generated by the Proposed Development due to energy use are therefore estimated to be about **7,267 tCO₂e**.

Operational Transport Emissions

- 7.79. To calculate the operational traffic associated with the Proposed Development, the number of trips per vehicle / transport mode, and the average trip distance, have been multiplied by emissions factors for each key vehicle type. The data required has been taken from the Transport Assessment undertaken by Curtins for the Proposed Development.
- 7.80. The calculation for annual transport emissions from various modes of transport during the operational phase of the Proposed Development are provided in **Table , Table and Table** .

Table 7.19 - Transport emissions for delivery and servicing vehicles during the operational phase

Metric	Unit	LGV	LGV (EV)	OGV
Total distance	<i>km/year</i>	15,762,735	100,831	948,897
Total vehicle trips	<i>vehicle trips/yr</i>	267,165	1,709	16,083
Total Passenger Trips	<i>Person trips/yr</i>	n/a	n/a	n/a

Average Trip length	km/trip	59.00	59.00	59.00
Emissions factor description	kgCO _{2e} /km	Average van (<3.5 tonnes), unknown fuel, per km	Average van (<3.5 tonnes), Battery EV, per km	Diesel HGV, Rigid (3.5-7.5 tonnes), Average laden, per km
Emissions factor value	kgCO _{2e} /km	0.2310	0.0623	0.4976
Total kgCO _{2e} /year	kgCO _{2e} /year	3,641,034	6,277	472,152

Table 7.20 - Transport emissions for car vehicle movements during the operational phase – Traffic data provided by Curtins

Metric	Unit	Car - Petrol	Car (BEV)	Car (PHEV)	Car (Hybrid)	Motorcycle
Total distance	km/year	16,835,150	200,982	168,350	486,155	128,468
Total vehicle trips	vehicle trips/yr	1,631,313	19,475	16,313	47,108	30,016
Total Passenger Trips	Person trips/yr	n/a	n/a	n/a	n/a	n/a
Average Trip length	km/trip	10.32	10.32	10.32	10.32	4.28
Emissions factor description	kgCO _{2e} /km	Average car, petrol, per km	Average car, battery electric vehicle, per km	Average car, Plug in Hybrid Electric Vehicle, per km	Average car, Hybrid, per km	Average motorcycle, per km
Emissions factor value	kgCO _{2e} /km	0.1705	0.0514	0.0935	0.1200	0.1136
Total kgCO _{2e} /year	kgCO _{2e} /year	2,870,393	10,330	15,739	58,358	14,588

Table 7.21 - Transport emissions for sustainable and active transport modes during the operational phase

Metric	Unit	Tram	Train	Bus	Taxi	Bicycle	On foot
Total distance	km/year	7,467,488	21,702,958	14,978,007	240,700	6,110,199	1,015,485
Total vehicle trips	vehicle trips/yr	n/a	n/a	n/a	n/a	823,477	424,889
Total passenger Trips	Person trips/yr	886,875	548,470	1,490,349	29,716	n/a	n/a
Average Trip length	km/trip	8.42	39.57	10.05	8.10	7.42	2.39
Emissions factor description	kgCO _{2e} /km	Light rail and tram, per passenger km	National rail, per passenger.km	Average local bus, per passenger.km	Regular taxi per passenger.km	Conventional bike, per passenger km	On foot
Emissions factor value	kgCO _{2e} /km	0.0286	0.0355	0.0965	0.1488	0.0049	0.0098
Total kgCO _{2e} /year	kgCO _{2e} /year	213,570	770,238	1,445,378	35,806	29,940	9,952

*Source: <https://www.nature.com/articles/s41598-020-66170-y>. These are estimated emissions per kilometre travelled for walking and cycling from energy intake required to compensate for increased energy expenditure, and data on food-related GHG emissions. We assume that persons who shift from passive modes of transport (e.g. driving) have increased energy expenditure that may be compensated with increased food consumption.

- 7.81. The scheme will facilitate up to 20% EV charging points. The total annual transport carbon emissions for the Proposed Development equates to **9,594 tCO₂e/yr** (**575,625 tCO₂e** in total) over the period of 60 years. Since the existing baseline and future baseline transport emissions are **663 tCO₂e/yr**, the transport carbon emissions from the Proposed Development is estimated to result in a **1,346%** increase in the emissions. For the Operational phase, the LGVs (38% of the total emissions) and cars (30% of the total emissions) are contributing the most significant proportion of these emissions.

End Of Life Phase

Embodied Carbon Emissions (Stage C1 to C4)

- 7.82. Activities during the end of life phase of the Proposed Development would generate GHG emissions, particularly from the demolition, waste processing and the disposal of building elements.
- 7.83. The calculations for the embodied carbon emissions generated during the end of life phase are provided in **Table** and **Table** .

Table 7.22 - Embodied carbon emissions during end of life (Domestic + flexible commercial space use)

Building Use (Domestic)	Total Carbon Emissions (tCO ₂ e)				
Domestic Residential Towers	C7	C8	E1	E2	D
C1-C4 End of life	2,725	2,729	3,103	3,070	6,822
Totals	18,449				

Table 7.23 - Embodied carbon emissions during end of life (Non-Domestic use)

Building Use (Non- domestic)	Total Carbon Emissions (tCO ₂ e)
Non-domestic (Plot D Offices)	97

Total Carbon Emission Summary

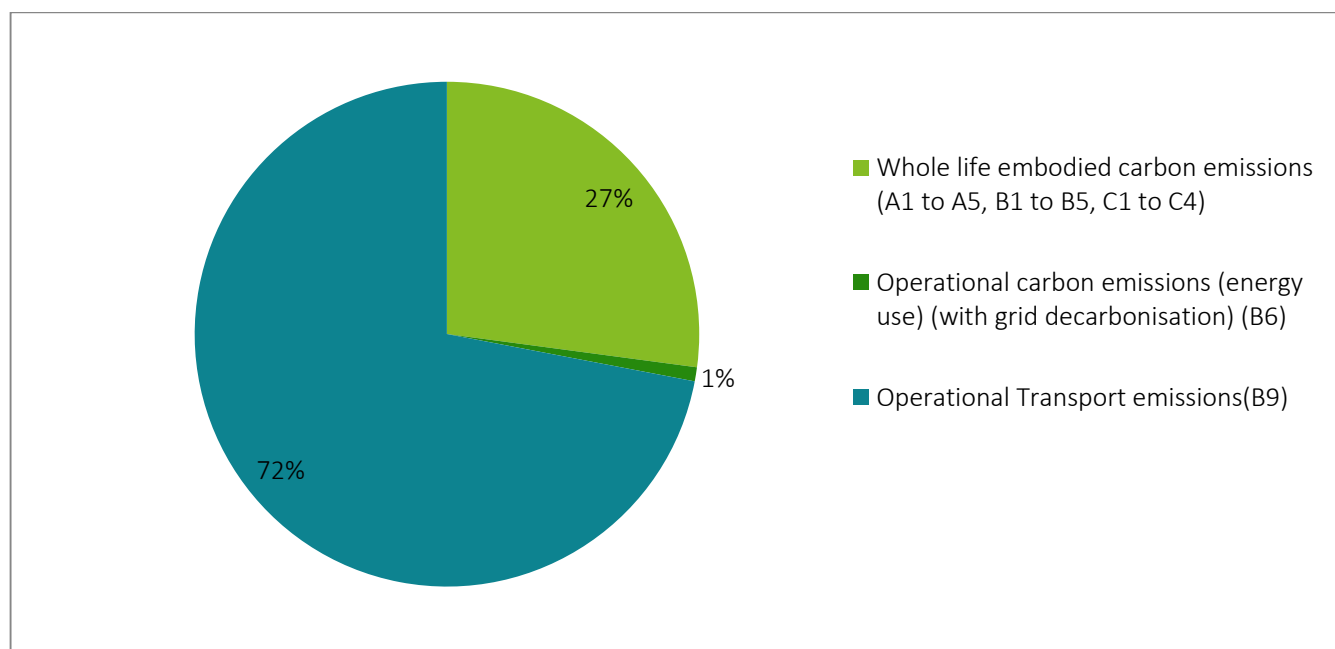
- 7.84. **Table** summarises the total whole life embodied carbon, operational carbon (energy) and transport emissions during the whole 60-year expected life of the Proposed Development (noting the varying time periods for different parts of the development, as set out in **Table 7.2**).

Table 7.24 - Summary of total embodied, operational and transport emissions over 60 years

GHG Emission Category	Value	Unit
Whole life embodied carbon emissions (A1-C4, excluding B6 and B7)	216,576	tCO ₂ e
Operational carbon emissions (energy use) (with grid decarbonisation)	7,267	tCO ₂ e
Operational Transport emissions	575,625	tCO ₂ e
Total	799,468	tCO₂e

- 7.85. The transport carbon emissions during the operation phase of the Proposed Development are estimated to have the highest carbon impact of all sources, constituting some 72% of the total carbon emissions. This is followed by the whole life embodied carbon emissions i.e carbon emissions from the construction, use, repair and maintenance, and end-of-life of the buildings on the Proposed Development site (27%). Carbon emissions from operational energy use are estimated to constitute only 1% of the total carbon emissions from the Proposed Development. (**Figure**).

Figure 7.2 –Breakdown of total carbon Emissions from the development over the lifetime of the scheme (60 years)



UK Carbon Budget Effect

- 7.86. In order to contextualise the GHG emissions generated by the Proposed Development during the operation phase, the results on the assessment of potential effects have been compared against the UK Carbon Budgets.
- 7.87. The total emissions during each of the UK Carbon Budget 5-year periods is presented in **Table** and compared in percentage terms to the respective budget.

Table 7.25 – Proposed Development impact on UK Carbon Budgets

GHG Carbon Budget Period	UK Carbon Budget (MtCO ₂ e)	Carbon Emissions from the Proposed Development (MtCO ₂ e)	% Share from UK Carbon Budget
Third: 2018-2022	2,544	0.0013	0.00005%
Fourth: 2023-2027	1,950	0.1574	0.00807%
Fifth: 2028-2032	1,725	0.0511	0.00296%
Sixth: 2033-2037	965	0.0494	0.00512%

- 7.88. The data in Table 7.25 show that the Proposed Development is not expected to influence the achievement of national carbon budgets in a way that is material or significant, throughout its construction, operation, and end of life phases.

Evaluation of Significant Effects

- 7.89. The significance of effects has been assessed using the methodology set out in this chapter.

Whole life embodied carbon emissions

- 7.90. The whole life embodied carbon emissions estimated to be generated by the domestic and flexible commercial space part of the Proposed Development is **805 kgCO₂e/m²** on average. This figure marginally exceeds the RIBA 2025 target of (<800 kgCO₂/m²) by less than 1%. With reference to Table 7.7, and as a worst-case scenario has been assessed with opportunities to significantly reduce carbon during detailed design, the Proposed Scheme in this circumstance is considered to have a **Minor adverse (not significant)** effect on climate. Opportunities to reduce the embodied carbon have been proposed as mitigation for consideration.
- 7.91. The whole life embodied carbon emissions estimated for the non-domestic (office) part of the Proposed Development are **700 kgCO₂e/m²** i.e. thus achieving the RIBA 2030 target (<750 kgCO₂e/m²). Therefore, as per the criteria stated in Table 7.7, embodied carbon emissions are likely to result in a **Negligible (not significant) effect**.
- 7.92. Table 7.26 below outlines the breakdown of the total **tCO₂e** per tower and for the office.

Table 7.26 – Breakdown of the whole life carbon emissions for each tower

Tower	Building type	Total Whole Life carbon (A1-A5, B1-B5, C1-C4) tCO ₂ e
C7	Domestic	34,690
C8	Domestic	34,757
E1	Domestic	38,421
E2	Domestic	37,982
D	Domestic	68,782
D (office)	Non-Domestic	1,946

Operational carbon emissions (energy)

- 7.93. The annual energy consumption of the domestic part of the Proposed Development is anticipated to be varied as different residential typologies have different energy consumption figures. The average consumption, however, is **60.28 kWh/m²/yr** which slightly exceeds RIBA 2025 targets (<60 kWh/m²/y). Therefore, as per the criteria mentioned in Table 7.7, operational energy emissions could be considered as likely to have a Moderate adverse (significant) effect on climate, however as the result is less than 1% over the RIBA 2025 target, the Proposed Development in this circumstance is considered to have a **Minor adverse (not significant)** effect on climate.
- 7.94. For non domestic (office building), the annual energy consumption is expected to be **65.98 kWh/m²/yr** which shows a better performance than the RIBA 2025 target for operational energy (<75 kWh/m²/yr). For the non domestic part (Amenity and retail areas), at an average of **56.06 kWh/m²/yr**, the figures also indicate a better energy performance than the RIBA 2025 targets (<75 kWh/m²/yr). Overall, as demonstrated in Figure , the carbon emissions due to operational energy use form only 1% of the total carbon impact of the project. Therefore, as per the criteria mentioned in Table 7.7, the operational energy emissions for the non-domestic typology are likely to be **Minor adverse (not significant)** for office building and **Minor adverse (not significant)** for Amenity and retail areas.

Operational Transport emissions

- 7.95. The annual operational transport emissions of the Proposed Development are estimated to be **9,594 tCO₂e**. This is a **1,346%** increase from the baseline transport carbon emission associated with the current use of the Site. There is currently no specific industry benchmark to assess the significance of transport carbon emissions of the Proposed Development. However, based on professional judgment and the criteria mentioned in Table 7.5, also considering the increase on the baseline and the fact that the magnitude of carbon emissions from transport is the highest contributor (72%) to the overall carbon emissions from the Proposed Development, the operational transport carbon emissions are likely to result in a **Major-Moderate adverse (significant)** effect on climate.

Cumulative Effects

- 7.96. Cumulative effects have not been assessed for the Proposed Development as committed developments have not been considered. The GHG emissions are assessed taking global climate as the receptor.

Mitigation Measures

Mitigation measures to be taken are listed herein.

Whole Life Embodied Carbon Emissions

- 7.97. To minimise carbon impacts (and hence avoid significant adverse effects) the performance management of whole life embodied carbon reduction of the Proposed Development should be organised along the industry recognised categories of sub-structure, superstructure, finishes, mechanical services and facades. Measures including optimising material usage, use of low carbon materials, reducing construction waste, integrating circular economy principles and using fewer finish materials (for wall, floor, ceiling, façade) must be optioneered at the appropriate RIBA stage.
- 7.98. Consideration must also be given to the robustness and durability of materials and assets and their lifetime replacement cycles. For example, consideration during later design stages should be made in accordance with the Circular Economy principles recommended by GLA in the Circular Economy Statement Guidance (2022) [13], which are presented in Table .

Table 7.27: Circular Economy Principles recommended by GLA in Circular Economy Statement Guidance (2022)

Principle	Develop commitments to...
1. Conserve resources, increase efficiency and source sustainably	1.1 Minimise the quantities of materials used
	1.2 Minimise the quantities of other resources used
	1.3 Specify and source materials and other resources responsibly and sustainably
2. Design to eliminate waste (and for ease of maintenance)	2.1 Design for longevity, adaptability or flexibility and reusability or recoverability
	2.2 Design out construction, demolition, excavation and municipal waste arising
3. Manage waste sustainably and at the highest value	3.1 Manage demolition waste
	3.2 Manage excavation waste
	3.3 Manage construction waste
	3.4 Manage municipal waste (and industrial waste, if applicable)

- 7.99. The next design stages of Proposed Development should also seek to align with the Whole Life Carbon reduction principles, as recommended by GLA in the Whole Life Carbon Assessment Guidance (2022) [14], presented in Table .

Table 7.28 : Principles for reducing WLC emissions recommended by GLA in the Whole Life Carbon Assessment Guidance (2022)

WLC reduction principles		Key benefits
1	Reuse and retrofit of existing buildings	Significant retention and reuse of structures is carbon efficient and reduces construction costs.
2	Use recycled or repurposed material	Reduces carbon emissions and reduces waste.
3	Material selection	Appropriate material choice is the key to carbon reduction. Ensuring that there is synchronicity between materials selected and planned life expectancy of the building reduces waste and the need for replacement, thus reducing in use costs.
4	Minimise operational energy use	A 'fabric first' approach should be prioritised to minimise energy demand and reduce carbon and in-use costs.
5	Minimise operational water use	Choice of materials and durability of systems, to avoid leakage and subsequent building damage, contribute to reducing the carbon cost of water use.
6	Disassembly and reuse	Designing for future disassembly ensures that products do not become future waste and maintain their environmental and economic value.
7	Building shape and form	Compact efficient shapes help minimise both operational and embodied carbon emissions for a given floor area. This means a more efficient building overall resulting in lower construction and in use costs.
8	Regenerative design	Removing CO2 from the atmosphere through materials and systems absorbing it makes a direct positive contribution to carbon reduction.
9	Designing for durability and flexibility	Durability means that repair and replacement is reduced which in turn helps reduce life-time building costs. A building designed for flexibility can respond with minimum environmental impact to future changing requirements and a changing climate, thus avoiding obsolescence which also underwrites future building value.
10	Optimisation of the relationship between operational and embodied carbon	Optimising the operational/embodied carbon relationship contributes directly to resource efficiency and overall cost reduction.
11	Building life expectancy	Defining building life expectancy gives guidance to project teams as to the most efficient choices for materials and products. This aids overall resource efficiency, including cost efficiency and helps future proof asset value.
12	Local sourcing	Sourcing local materials reduces transport distances and supply chain lengths and has associated local social and economic benefits.
13	Minimising waste	Waste represents an unnecessary and avoidable carbon cost. Buildings should be designed to minimise fabrication and construction waste, and to ease repair and replacement with minimum waste, which helps reduce initial and in-use costs.
14	Efficient fabrication	Efficient construction methods (e.g. modular systems, precision manufacturing and modern methods of construction) contribute to better build quality, reduce construction phase waste and reduce the need for repairs during post completion and the defects period (snagging).
15	Lightweight construction	Lightweight construction uses less material which reduces the carbon footprint of the building as there is less material to source, fabricate and deliver to site.

Construction Transport Emissions

Embedded Mitigation

- 7.100. An Outline Construction Logistics Plan has been prepared detailing the proposed number of vehicles and programme over the illustrative phases of the proposed development;
- 7.101. Measures proposed in the Transport Assessment and the accompanied Framework Travel Plan submitted in support of the planning application, to encourage workers to travel to the Application Site in a sustainable manner

Additional Mitigation

- 7.102. Additional mitigation methods include use of local materials where possible to reduce transport distances and supply chain lengths while providing additional local social and economic benefits.
- 7.103. Traffic management measures will be implemented and managed to restrict construction vehicles in certain locations and routes at certain times of the day. Contractors should follow sustainable construction principles before commencement and be encouraged to actively submit solutions aimed at reducing trips to site and construction traffic. Considerate construction best practices (such as wheel washing) should be adopted.
- 7.104. It is advised that the concrete existing on-site to be crushed and re-mixed on-site where possible, to reduce need for transportation.

Operational Transport Emissions

Embedded Mitigation

- 7.105. The Proposed Development is located in Manchester city centre, which is one of the most sustainable locations, particularly in relation to key pedestrian, rail, Metrolink and bus transport routes. Accessibility by sustainable modes of travel is excellent and is reflected by the Greater Manchester Accessibility Level 8. A travel plan will be prepared in the later stages for the project which will further promote sustainable transport.
- 7.106. To further enhance the sustainable credentials of the proposals, a Transport Assessment has been prepared by Curtins Limited. The Assessment concludes that future residents and building occupants will have a variety of sustainable travel options that will reduce reliance on the car. Overall, the development will provide improvements to the surrounding area as part of the Strategic Regeneration Framework to enhance the environment for all road users, most notably pedestrians and cyclists.
- 7.107. The Proposed Development will offer 1:1 cycle parking provision provided in secure, internal locations across the basement levels within the site to encourage the use of sustainable modes of transport.
- 7.108. A suitable level of parking is proposed to meet demand yet reflect the highly accessible location of the Site in terms of opportunities for active and sustainable travel. Renaker will provide on-demand Electric Vehicle Charge (EVC) provision for up to 20% of the parking spaces (on demand basis) throughout the lifetime of the development in alignment with trends in EV use to facilitate the increasing, widespread transition to electric car usage and ultimately help to support a growing sustainable community.

Additional Mitigation

- 7.109. Provision of additional EV charging points and adopting an all-electric approach for the Proposed Development can be looked at in the future.

Operational Building Emissions

Embedded Mitigation

- 7.110. Proposed embedded mitigation measures are included in the Environmental Standards Statement prepared by Element Sustainability.

Additional Mitigation

- 7.111. Whilst the development achieves the RIBA 2025 targets, improvements in the embedded mitigation provisions currently proposed in the design will be reviewed to improve on their performance. This will be within the viability constraints of the Proposed Scheme to embrace technological improvements in regulated and unregulated energy consumption as the design progresses and technologies become more commercially viable.
- 7.112. This will include educating the occupiers to use less electricity and water through information releases and social media platforms associated with the development to target awareness and lower consumption

Residual Effects

- 7.113. Following the application of commitments and mitigation measures, the effects from whole life embodied emissions (including construction transport) and operational building emissions assessed are likely to have a residual negligible magnitude of impact and therefore the residual significance of effects will be negligible i.e. 'not-significant'. For the operational transport emissions, the residual significance of effects will be Moderate-Minor (adverse) i.e. 'not-significant'.
- 7.114. A summary is provided in Table and Table :

Table 7.29 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase

Likely Significant Effect	Receptor(s)	Significance	Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Whole Life Embodied emissions (incl. construction transport)	Global Climate (Sensitivity: High)	Minor adverse	Consideration should be given to the robustness and durability of materials and assets and their lifetime replacement cycles. Consideration during later design stages where possible should also be given to the Circular Economy principles recommended by GLA in the Circular Economy Statement Guidance Further optimisation of the construction transport schedule along with procurement of local materials to be further explored in later design stages, where possible.	Negligible (Permanent)

Table 7.30 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Significance	Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Building emissions	Global Climate (Sensitivity: High)	Minor Adverse	Procurement of energy efficient equipment and, Robust monitoring of energy consumption (i.e., smart metering)	Negligible (Permanent)

Likely Significant Effect	Receptor(s)		Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Transport emissions	Global Climate (Sensitivity: High)	Major - Moderate Adverse	Proposed additional mitigation measures includes the initiatives proposed in the Transport Assessment submitted in support of the planning application, to encourage people to travel to the Proposed Development in a sustainable manner.	Moderate-Minor Adverse (Permanent)

Reference List

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

- Greenhouse gas reporting: conversion factors 2022. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022> (Accessed 15/01/2023)
- HM Government, 2021 Transitioning to zero emission cars and vans: 2035 delivery plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005301/transitioning-to-zero-emission-cars-vans-2035-delivery-plan.pdf (Accessed 15/01/2023)
- HM Government, 2008. Climate Change Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/introduction> (Accessed 03/12/2022).
- HM Government, 2008. Planning and Energy Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/21/introduction> (Accessed 03/12/2022).
- HM Government, 2021. The Carbon Budgets Order 2021. Available at: <https://www.legislation.gov.uk/uksi/2021/750/contents/made> (Accessed 03/12/2022)
- DECC, 2011. The Carbon Plan: Delivering our Low Carbon Future. Available at: <https://www.ukgbc.org/sites/default/files/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf> (Accessed 19/02/2023).
- Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed 19/02/2023)
- Manchester City Council, The Manchester Local Development Framework. Available at: General information | About the Local Development Framework (LDF) | Manchester City Council (Accessed 20/01/2023)
- Institute of Environmental Management and Assessment, 2022. Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (Accessed 20/01/2023)
- Royal Institute of British Architects (RIBA), 2021. RIBA 2030 Climate Challenge version 2 (2021). Available at: <https://www.architecture.com/about/policy/climate-action/2030-climate-challenge/resources> (Accessed 10/01/2023)
- RICS Guidance WLCA for the Built Environment. Available at: <https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/building-surveying-standards/whole-life-carbon-assessment-for-the-built-environment> (Accessed 20/02/2023)
- PAS 2080 Guidance Document. Available at: https://media.a55j14j15-publicinquiry.co.uk/uploads/2021/08/19124926/4.01.46-PAS_2080_Carbon_Management_In_Infrastructure-7.pdf (Accessed 20/02/2023)
- GLA Circular Economy Statements Guidance (2022). Available at: [circular_economy_statements_lpg_0.pdf \(london.gov.uk\)](https://www.london.gov.uk/sites/default/files/circular_economy_statements_lpg_0.pdf) (Accessed 18/02/2023)
- GLA Whole Life Cycle Carbon Assessments Guidance (2022). Available at: https://www.london.gov.uk/sites/default/files/lpg_-_wlca_guidance.pdf (Accessed 18/02/2023)

8. Daylight, Sunlight & Overshadowing

Introduction

- 8.1. This Chapter of the ES has been prepared by GIA and assesses the likely significant effects of the Proposed Development with respect to daylight and sunlight 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 adverse impacts and the likely residual impacts after these methods have been adopted.
- 8.2. This Chapter is accompanied by three technical appendices, Drawings of the Baseline and Proposed Scenario (Appendix 8.1), Daylight and Sunlight Results for Baseline and Proposed Scenario (Appendix 8.2) and Overshadowing Results and Drawings (Appendix 8.3).
- 8.3. The author of this chapter has a BSc (Hons) degree in Building Surveying and is a Member of the Royal Institution of Chartered Surveyors. The author has nine years post-qualification experience and has specialised in daylight and sunlight for eight years. GIA are the largest specialist daylight and sunlight advisor in the UK, with over 29 years of expertise in the discipline, and the author has prepared daylight and sunlight ES chapters for several large-scale developments throughout the country.

Assumptions and Limitations

- 8.4. Where actual room layouts were available on the planning portal, these have been considered in regard to the modelling of 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.
- 8.5. 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.

Legislative and Policy Context, Guidance

Legislation

- 8.6. There is no legislation that governs daylight and sunlight, with the criteria for assessment relating to daylight and sunlight covered by national and local policy in addition to BRE guidance as set out below.

National Planning Policy

National Planning Policy Framework (2021)

- 8.7. The National Planning Policy Framework was updated on 20 July 2021. It 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*” (Paragraph 130).

National Planning Practice Guidance (NPPG) 2019

- 8.8. The National Planning Practice Guidance (NPPG) – Effective 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.”

8.9. 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)

- 8.10. 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.
- 8.11. 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.

Guidance

Building Research Establishment (BRE) ‘Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice’, Third Edition, 2022

- 8.12. The Building Research Establishment (BRE) Guidelines ‘Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2022, 3rd edition’ 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 2011 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.”

- 8.13. It also states:

“The advice is 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 maybe unavoidable if new developments are to match the height and proportions of existing building” (para.1.6).

- 8.14. In addition, the BRE Guidelines state (para. 1.3) that,

- 8.15. *“it is intended to be read in conjunction with the interior daylighting recommendations in BS EN 17037 Daylighting in Buildings, and in the CIBSE publication LG 10 Daylighting – a guide for designers”.*

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

- 8.16. 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.

Assessment Methodology and Significance Criteria

Methodology for Determining Baseline Conditions and Sensitive Receptors

- 8.17. 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.”*
- 8.18. The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the Proposed Development.
- 8.19. The following properties are defined as receptors and will be considered due to their proximity to the Site, and their use:
- Hill Quays
 - Lumiere
 - Deansgate Square
 - City South
 - Deansgate Quay
 - Castle Wharf
 - Castlegate
 - Citygate
 - Castle Quay
 - Blade
 - Three60
 - Elizabeth Tower
 - School House, Jackson Crescent
 - Plot F, Great Jackson Street
 - Plot G, Great Jackson Street
 - Deansgate South
- 8.20. These properties are identified in the drawings contained at Appendix 8.1.
- 8.21. 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.
- 8.22. The Boatmans does not have any habitable rooms facing the proposed development Site and has therefore not been included in the technical assessment.
- 8.23. Crown Street School has been coped out of the assessment on the basis it does not constitute a sensitive receptor in the BRE guidance.
- 8.24. The following outdoor amenity areas have been assessed for overshadowing:
- Crown Street Phase 2 public realm, including Blade, Three60 and Crown Street Primary School (consented but not yet operational)
 - Plot F, Great Jackson Street public realm (consented but not yet operational)
 - Deansgate Square public realm (complete and operational)

Methodology for Determining Demolition and Construction Effects

- 8.25. 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.
- 8.26. 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.

Methodology for Determining Operational Effects

- 8.27. 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).
 - Overshadowing
 - Sun Hours on Ground (SHOG).

Outline Approach for Daylight, Sunlight and Overshadowing Assessments

- 8.28. 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.
- 8.29. The 3D model uses Waldrum 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 sun hours on ground in each scenario.
- 8.30. 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

- 8.31. 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”.*

- 8.32. 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.
- 8.33. 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'.
- 8.34. 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.
- 8.35. 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

- 8.36. 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.
- 8.37. 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.
- 8.38. 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.
- 8.39. 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

- 8.40. 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 1486, and each spot equates to 14.86 hours of the total annual sunlight hours.
- 8.41. 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.
- 8.42. 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”.

- 8.43. 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%.
- 8.44. 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.

Overshadowing

Sun Hours on Ground

- 8.45. The method for assessing hours in sun is the ‘sun-on-ground indicator’. The assessment applies to both to new and existing gardens/amenity areas, which are affected by new developments. The BRE Guidelines suggest that the Spring Equinox (21 March) is a suitable date for the assessment. Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.
- 8.46. The BRE Guidelines recommend that at least half of a garden or amenity area should receive at least 2 hours of sunlight on March 21 or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).
- 8.47. The BRE Guide does also refer to transient overshadowing, where it states:
“It is often illustrative to plot a shadow plan showing the location of shadows at different times of the day and year.”
- 8.48. There are no numerical targets associated with the shadow paths upon which significance criteria can be applied. An analysis of the shadows cast by the Proposed Development, using Scenario Two have been undertaken, as this represents a worst-case scenario. The plots illustrate the baseline and proposed shadowing during daylight hours on 21 March.

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 is 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%.
SHOG	An amenity area may be adversely affected if less than 50% of its area receives less than 2 hours of direct sunlight on 21 March and less than 0.8 times its former value.

Significance Evaluation Methodology

Daylight, Sunlight and Overshadowing 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 will be used to determine any impacts based on the guidance set out in Appendix I of the BRE Guidelines. Potential effects will be identified as beneficial, adverse or negligible, and their magnitude of effects will be 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 surrounding 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 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 occupied by low-rise structures and is underutilised, meaning it is underdeveloped and unusually open aspect given the city centre location. These receptors are therefore deemed to have a medium to low sensitivity.
- 8.57. The following existing receptors are defined as having a medium sensitivity:
- Hill Quays
 - Lumiere
 - Deansgate Square
 - City South
 - Deansgate Quay
 - Castle Wharf
 - Castlegate
 - Citygate
 - Castle Quay
 - Elizabeth Tower
 - School House, Jackson Crescent
- 8.58. The following receptors are not yet constructed or completed and, as such, are defined as having a low sensitivity:
- Blade
 - Three60
 - Plot F, Great Jackson Street
 - Plot G, Great Jackson Street
 - Deansgate South
 - Bridgewater House
 - Crown Street Primary School

Scenarios Tested

- 8.59. The following scenarios have been assessed and are reported within this Chapter of the ES:
- Scenario One: Baseline;

- Scenario One - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative.

- 8.60. 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.
- 8.61. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to daylight, sunlight and overshadowing, and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that daylight, sunlight and overshadowing will be testing the development as a whole.
- 8.62. The Baseline scenario considers the current baseline condition (as can be seen in February 2023). This scenario is depicted on drawing nos. 2116/01-03 (Appendix 8.1).
- 8.63. The Proposed Development Scenario One is illustrated on drawing nos. 2116/04-06 (Appendix 8.1).

The Study Area

- 8.64. There is no specific guidance relating to the extent of a study area. The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the Site.

Source of Effect

- 8.65. The increase in massing on the Site will create an obstruction that may result in a reduction to the levels of daylight and sunlight to the surrounding sensitive receptors.

Significance of Effects

- 8.66. 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 – Minor Adverse / Beneficial*
Moderate	Moderate Adverse / Beneficial*	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
Minor	Moderate – Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor – Negligible
Negligible	Negligible	Negligible	Negligible
Key		*Significant in terms of EIA regulations	

- 8.67. 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 baseline levels, percentage alterations, absolute changes, sensitivity of the receptor and room use, 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.
- 8.68. When assigning significance criteria for sun hours on ground effects, consideration has been given to the nature of the adjoining amenity space, as well as the percentage alterations, absolute changes, sensitivity of the receptor, and any other relevant factors.

Baseline Conditions

Daylight & Sunlight

- 8.69. The full Baseline Daylight and Sunlight results can be found in Appendix 8.2 and are summarised in Table 8.4 below.
- 8.70. A total of 16,447 windows facing the Site serving 8,166 rooms within 18 buildings were assessed for VSC and NSL for daylight and 2,166 rooms were assessed for APSH for sunlight within 16 buildings.
- 8.71. Out of the 16,477 windows assessed for daylight, 6,277 (38%) meet the BRE guidelines for VSC. For NSL, 5,420 (66%) of the 8,166 rooms assessed meet the BRE criteria. For sunlight, 1,717 (79%) of the 2,166 rooms assessed meet the BRE criteria for both Winter and Annual APSH.
- 8.72. Overall, this baseline scenario is considered a low level of compliance. These levels of daylight and sunlight are commensurate with what is to be expected in the locality owing to the city centre context of the Site and height and density in the area.
- 8.73. The Site is underdeveloped in the context of the Great Jackson Street Framework, but also when considered against the wider established residential buildings. The Site is therefore unusually open aspect given its location, albeit the height and density in the immediate locality results in lower baseline daylight and sunlight levels to the surrounding receptors.

The Proposed Development is anticipated to reduce the levels of daylight and sunlight to the surrounding sensitive receptors. If the Proposed Development was not constructed the baseline daylight and sunlight levels would remain the same.

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
Hill Quays	5	368	28	157	29	87
Lumiere	3	159	14	116	12	56
Deansgate Square	2,158	5,185	1,639	2,555	702	913
City South	0	176	26	148	8	15
Deansgate Quay	0	62	6	43	2	24
Castle Wharf	30	455	71	278	35	100
Castlegate	7	139	68	100	1	7
Citygate	15	177	84	116	-	-
Castle Quay	22	153	48	78	10	12
Blade	299	470	282	282	47	47
Three60	844	864	384	384	96	96
Elizabeth Tower	248	1,034	380	538	189	195
School House, Jackson Crescent	2	18	18	18	-	-
Plot F, Great Jackson Street	945	2,402	1,282	1,702	362	368

Plot G, Great Jackson Street	1,691	4,394	853	1,355	181	185
Deansgate South	8	204	164	186	21	21
Bridgewater House	0	139	69	94	21	25
Crown Street Primary School	0	48	4	16	1	15
Total	6,277	16,447	5,420	8,166	1,717	2,166

Identification and Evaluation of Likely Significant Effects

Daylight to Surrounding Sensitive Receptors

- 8.74. The full Proposed Development daylight results can be found within Appendix 8.2 and are summarised in Tables 8.5 and 8.6 below.
- 8.75. A total of 16,447 windows serving 8,166 rooms were assessed for daylight within 18 buildings considered to be sensitive receptors.
- 8.76. 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				
	Total No. of Windows	No. of Windows That Meet BRE	Below BRE Guidelines		
			Minor Adverse	Moderate Adverse	Major Adverse
Hill Quays	368	237	41	52	38
Lumiere	159	159	0	0	0
Deansgate Square	5,185	3,064	504	749	868
City South	176	157	6	4	9
Deansgate Quay	62	33	0	0	29
Castle Wharf	455	285	11	22	137
Castlegate	139	43	13	23	60
Citygate	177	177	0	0	0
Castle Quay	153	127	4	1	21
Blade	470	342	79	49	0
Three60	864	121	70	149	524
Elizabeth Tower	1,034	719	87	191	37
School House, Jackson Crescent	18	6	12	0	0
Plot F, Great Jackson Street	2,402	1,288	241	242	631
Plot G, Great Jackson Street	4,394	3,861	528	5	0
Deansgate South	204	0	12	54	138
Bridgewater House	139	58	9	2	70
Crown Street Primary School	48	26	11	4	7
Total	16,447	10,703	1,628	1,547	2,569

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
Hill Quays	157	121	12	6	18
Lumiere	116	109	2	2	3
Deansgate Square	2,555	2,091	209	96	159
City South	148	118	13	6	11
Deansgate Quay	43	17	0	0	26
Castle Wharf	278	176	27	35	40
Castlegate	100	50	22	17	11
Citygate	116	116	0	0	0
Castle Quay	78	72	2	2	2
Blade	282	282	0	0	0
Three60	384	281	95	8	0
Elizabeth Tower	538	499	11	28	0
School House, Jackson Crescent	18	17	1	0	0
Plot F, Great Jackson Street	1,702	1,508	99	33	62
Plot G, Great Jackson Street	1,355	1,279	39	23	14
Deansgate South	186	15	23	41	107
Bridgewater House	94	54	2	3	35
Crown Street Primary School	16	15	1	0	0
Total	8,166	6,820	558	300	488

Understanding the Effects in Context to the Site and Surroundings

- 8.77. The context of the EIA Site and surrounding area is key to understanding the sensitivity of the surrounding receptors and significance of daylight and sunlight effects.
- 8.78. The Great Jackson Street Development Framework (May 2018) was prepared to “*guide the future comprehensive regeneration of the Great Jackson Street area*”. The May 2018 document is an update of the 2007 and 2015 frameworks in response to the ongoing redevelopment of the area.
- 8.79. A key principle of the 2015 Framework was to “*create a new residential neighbourhood of choice...to increase the height and density of buildings in key locations to reflect the site’s location at a key gateway to the City Centre, and also to facilitate an increased quantum and quality of public space*”.
- 8.80. It is well established that the published targets within the BRE Guide are based on low rise, suburban development. The NPPG – Making Efficient Use of Land published on 29th November 2016, updated 1st October 2019, Paragraph 007 Reference ID: 66-007-20190722 states:
- 8.81. “*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.*”
- 8.82. This is a key point to consider in respect of the Proposed Development and its impact on surrounding properties, particularly as it is situated in Manchester City Centre. The Manchester Core Strategy 2012-2027 sets out development principles for the city centre in Policy CC 6 (p60), which states the following:
- 8.83. “*City Centre development will generally be high-density. It is a location where land should be used to its maximum efficiency. The appropriate scale, massing and height of development in the City Centre will significantly exceed what is appropriate elsewhere in the City.*”
- 8.84. This is reinforced by the Great Jackson Street Framework 2018, which identifies a greater emerging density and an expectation for higher rise, and denser urban environment than other parts of the city. The endorsed SRF guidance identifies a high density built character for the SRF area. On this basis, and in accordance with BRE guidance, a different daylight benchmark for the surrounding sensitive receptors is considered to be appropriate.
- 8.85. This approach is also acknowledged in the BRE Guide, which states:
- 8.86. “*in special circumstances the developer or planning authority may wish to use different target values... in a historic city centre, or 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*”.
- 8.87. It would therefore be unrealistic for the surrounding residential properties to expect to maintain similar levels of daylight as those currently experienced, as the Site is underutilised with only very low structures. Furthermore, as the EIA Site has been proposed for redevelopment in the SRF for several years, surrounding residents will have an expectation of high-density development coming forward, and an understanding that the current daylight conditions were never intended to be permanent.

Manchester City Centre Benchmarking

- 8.88. In light of the contextual discussion above, in order to fully understand the results in context, it is appropriate to consider what are deemed to be appropriate daylight levels in the city centre. The retained VSC daylight levels in established, successful residential areas in the city centre of Manchester have therefore been reviewed and are set out below. The areas reviewed all include successful residential buildings and are recognised as positive urban environments that people choose to live in and, whilst not necessarily of similar density, the locations give practical, recognisable examples of living conditions around the city centre. This is an evidential method of benchmarking daylight levels in a dense, urban area, which allows a better understanding of the application of the BRE guide in such locations.

Table 8.7 – Retained VSC Daylight Levels in Manchester City Centre

Address	Retained VSC Daylight Level
Boxworks, Castlefield	5.1%
Deansgate Quay, Deansgate	5.7%
MoHo, Castlefield	6.4%
Hill Quays, Great Jackson Street	6.4%
Lumiere, Great Jackson Street	7.1%
Anvil Street, McIntosh Village	8.0%
Princess House, Oxford Road	11.9%
The Hacienda, Whitworth Street West	13.6%
Gallery Gardens, Castlefield	13.9%
Britannia Mills, Castlefield	18.0%
12 Thomas Street, Northern Quarter	20.2%
Elizabeth Tower	22.3%
Plot F, Great Jackson Street	22.7%
Plot G, Great Jackson Street	23.0%
Deansgate Square, Great Jackson Street	23.6%

- 8.89. The above table demonstrates that a number of the most successful and desirable residential locations in Manchester city centre do not meet the BRE target criteria. In some cases, the levels of retained daylight are substantially below the BRE targets. The city centre context is such that deviations from the BRE target criteria are to be anticipated, and this sets the benchmark of what is acceptable in terms of daylight giving due consideration to the specific site characteristics, history and location.
- 8.90. The impacts discussed to the surrounding sensitive receptors below have therefore been considered in context to the BRE guidance, but also against what is considered acceptable in other residential locations in Manchester city centre.

Hill Quays

- 8.91. A total of 368 windows serving 157 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.92. For VSC, 237 (64%) of the 368 windows meet the BRE criteria. 41 of the affected windows will experience an alteration between 20-30%, 52 of the affected windows will experience an alteration between 30-40%, and the remaining 38 windows will experience alterations in excess of 40% from the baseline value.
- 8.93. For NSL, 121 (77%) of the 157 rooms assessed will meet the BRE criteria. 12 of the affected rooms will experience an alteration between 20-30%, six of the affected rooms will experience an alteration between 30-40%, and the remaining 18 rooms will experience alterations in excess of 40% from the baseline value.
- 8.94. The property has low retained baseline daylight levels, and only 1% of windows meet the BRE criteria for VSC daylight. This places a high burden on the EIA Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes. This is evidenced by the fact the average baseline VSC level is 6.48%, and the average level with the proposal built out is 6.16%. Furthermore, the largest absolute change in VSC is 2.6%, which the BRE state would not be noticeable to occupants were the affected windows receiving the published BRE target of 27% VSC in the baseline scenario.
- 8.95. The design of Hill Quays is such that deep, single aspect rooms are located on the boundary facing the Site.
- 8.96. The BRE discusses the neighbourliness of surrounding properties, stating that *“another important issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light”*.
- 8.97. The BRE states further that *“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”*. The design of Hill Quays is such that it places a high burden on the Site to maintain the existing levels and leads to a number of rooms not meeting the NSL criteria.
- 8.98. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.99. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has low baseline daylight levels, which places a high burden on the Site to maintain existing levels;
 - The average VSC daylight levels are reduced from 6.48% to 6.16% with the Proposed Development in place, which is a minor reduction;
 - The largest absolute change in VSC is 2.6%, which the BRE state would not be noticeable to occupants were the windows receiving the published BRE target of 27% in the baseline scenario; and
 - The building is designed with deep, single aspect rooms served by recessed windows located beneath balconies, which leads to low baseline levels and makes deviations from the BRE target criteria unavoidable.

Lumiere

- 8.100. A total of 159 windows serving 116 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.101. For VSC, 159 (100%) of the 159 windows meet the BRE criteria.
- 8.102. For NSL, 109 (94%) of the 116 rooms assessed will meet the BRE criteria. Two of the affected rooms will experience an alteration between 20-30%, two of the affected rooms will experience an alteration between 30-40%, and the remaining three rooms will experience alterations in excess of 40% from the baseline value.
- 8.103. The property has low retained baseline daylight levels, and only 12% of rooms meet the BRE criteria for NSL daylight. This places a high burden on the Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes.
- 8.104. Furthermore, three of the rooms which do not meet the NSL daylight target are bedrooms, which the BRE consider as having a lesser requirement for daylight than principal, habitable rooms.
- 8.105. Similar to Hill Quays, the building is constructed up to its boundary, with deep, single aspect rooms overlooking the Site. Several windows are recessed into deep reveals and located beneath balconies, which results in low baseline levels and places a high burden on the Development Site to maintain them.
- 8.106. As such, the design of Lumiere is such that it places a high burden on the development Site to maintain the existing levels and leads to some rooms not meeting the NSL criteria.
- 8.107. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.108. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property fully accords with the BRE target criteria for VSC daylight;
 - The property has low baseline daylight levels, which places a high burden on the Site to maintain existing levels; and
 - The building is designed with deep, single aspect rooms served by recessed windows located beneath balconies, which leads to low baseline levels and makes deviations from the BRE target criteria unavoidable.

Deansgate Square

- 8.109. A total of 5,185 windows serving 2,555 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.110. For VSC, 3,064 (59%) of the 5,185 windows meet the BRE criteria. 504 of the affected windows will experience an alteration between 20-30%, 749 of the affected windows will experience an alteration between 30-40%, and the remaining 868 windows will experience alterations in excess of 40% from the baseline value.
- 8.111. For NSL, 2,091 (82%) of the 2,555 rooms assessed will meet the BRE criteria. 209 of the affected rooms will experience an alteration between 20-30%, 96 of the affected rooms will experience an alteration between 30-40%, and the remaining 159 rooms will experience alterations in excess of 40% from the baseline value.
- 8.112. The existing Site conditions are a material consideration in understanding the impacts on Deansgate Square in context. The Site is underdeveloped in the baseline scenario, meaning the apartments in this receptor overlooking the Site benefit from higher baseline daylight levels than would typically be expected in a city centre environment. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the residents of Deansgate Square will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in daylight levels to Deansgate Square have always been anticipated.
- 8.113. Notwithstanding, Deansgate Square will retain average VSC daylight levels of 19.76% with the Proposed Development in place, which is reduced from 23.64% in the baseline scenario. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered acceptable and commensurate with other successful residential locations in the city centre. It should also be noted that the reduction in average VSC levels is less than the 20% BRE target.
- 8.114. For VSC daylight, 909 of the windows which do not meet the BRE criteria are bedrooms, which the BRE consider as having a lesser requirement for daylight than principal, habitable rooms. The buildings are designed to limit single aspect habitable rooms, and most apartments overlooking the Site are provided with dual aspect accommodation. As such, although windows which face towards the Site may not meet the VSC daylight criteria, the rooms they serve are typically lit from an alternative elevation which has not been included in the assessment as it faces away from the Site.
- 8.115. For NSL daylight, 305 rooms which do not meet the BRE criteria are bedrooms, which the BRE considered to have a lesser requirement for daylight. As such, 159 living kitchen diners do not meet the NSL daylight criteria, which represents 6% of rooms assessed to this receptor. This is a small proportion relative to the receptor as a whole, and therefore considered minor.
- 8.116. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.117. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has higher baseline daylight levels given the underdeveloped nature of the Site;
 - The baseline levels were never anticipated to be a permanent condition as the Site has been proposed for high density development in the SRF for several years;
 - The residents of Deansgate Square were therefore aware of the proposed development and anticipated changes in daylight;
 - The property will retain average VSC daylight levels of 19.76%, which is commensurate with other successful residential locations in the city centre.
 - Retained VSC daylight levels are reduced by less than 20% with the Proposed Development in place, which is considered minor; and
 - Several of the windows and rooms which do not meet the BRE target criteria are bedrooms, which are considered by the BRE as having a lesser requirement for daylight.

City South

- 8.118. A total of 176 windows serving 148 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.119. For VSC, 157 (89%) of the 176 windows meet the BRE criteria. Six 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 nine windows will experience alterations in excess of 40% from the baseline value.
- 8.120. For NSL, 118 (80%) of the 148 rooms assessed will meet the BRE criteria. 13 of the affected rooms will experience an alteration between 20-30%, six of the affected rooms will experience an alteration between 30-40%, and the remaining 11 rooms will experience alterations in excess of 40% from the baseline value.
- 8.121. The property has low retained baseline daylight levels. None of the windows assessed, and only 20% of rooms assessed, meet the BRE criteria for VSC and NSL daylight respectively in the baseline scenario. This places a high burden on the Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes. This is evidenced by the fact the average baseline VSC level is 9.81%, and the average level with the proposal built out is 9.52% VSC. Absolute changes are also relatively small, and no window is reduced by greater than 1.5% VSC which, given the dense, urban nature of the location, is considered minor.
- 8.122. The design of City South is a contributing factor to the low baseline levels. Rooms facing the Site are typically single aspect with deep floorplates, and several windows are located beneath balconies.
- 8.123. 14 of the windows that do not meet the VSC daylight criteria, and 21 rooms which do not meet the NSL daylight criteria, are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.
- 8.124. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.125. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has low baseline daylight levels, which places a high burden on the Site to maintain existing levels;
 - The average VSC daylight levels are reduced from 9.81% to 9.52% with the Proposed Development in place, which is a minor reduction;
 - The largest absolute change in VSC is 1.5%, which the BRE state would not be noticeable to occupants were the windows receiving the published BRE target of 27% in the baseline scenario;
 - The design is such that deep, single aspect rooms face the Site, several of which are located beneath balconies; and
 - Several of the affected windows and rooms are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.

Deansgate Quay

- 8.126. A total of 62 windows serving 43 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.127. For VSC, 33 (53%) of the 62 windows meet the BRE criteria. None of the affected windows will experience an alteration between 20-30%, none of the affected windows will experience an alteration between 30-40%, and the remaining 29 windows will experience alterations in excess of 40% from the baseline value.
- 8.128. For NSL, 17 (40%) of the 43 rooms assessed will meet the BRE criteria. None of the affected rooms will experience an alteration between 20-30%, none of the affected rooms will experience an alteration between 30-40%, and the remaining 26 rooms will experience alterations in excess of 40% from the baseline value.
- 8.129. The property has low retained baseline daylight levels. None of the windows assessed, and only 14% of rooms assessed, meet the BRE criteria for VSC and NSL daylight respectively in the baseline scenario. This places a high burden on the Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes. This is evidenced by the fact the average baseline VSC level is 5.76%, and the average level with the proposal built out is 3.95% VSC. Absolute changes are also relatively small, and no window is reduced by greater than 5.1% VSC which, given the dense, urban nature of the location, is considered minor.
- 8.130. The design of Deansgate Quay is a contributing factor to the low baseline levels. Rooms facing the Site are typically single aspect with deep floorplates, and several windows are located beneath balconies.
- 8.131. 14 windows which do not meet the BRE criteria for VSC daylight, and 14 rooms which do not meet the NSL target criteria, are bedrooms, which the BRE consider as having a lesser requirement for daylight than principal, habitable rooms.
- 8.132. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.133. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has low baseline daylight levels, which places a high burden on the Site to maintain existing levels;
 - The average VSC daylight levels are reduced from 5.76% to 3.95% with the Proposed Development in place, which is a minor reduction;
 - The largest absolute change in VSC is 5.1%, which the BRE state would not be noticeable to occupants were the windows receiving the published BRE target of 27% in the baseline scenario;
 - The design is such that deep, single aspect rooms face the Site, several of which are located beneath balconies; and
 - Several of the affected windows and rooms are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.

Castle Wharf

- 8.134. A total of 455 windows serving 278 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.135. For VSC, 285 (63%) of the 455 windows meet the BRE criteria. 11 of the affected windows will experience an alteration between 20-30%, 22 of the affected windows will experience an alteration between 30-40%, and the remaining 137 windows will experience alterations in excess of 40% from the baseline value.
- 8.136. For NSL, 176 (63%) of the 278 rooms assessed will meet the BRE criteria. 27 of the affected rooms will experience an alteration between 20-30%, 35 of the affected rooms will experience an alteration between 30-40%, and the remaining 40 rooms will experience alterations in excess of 40% from the baseline value.
- 8.137. The property has low retained baseline daylight levels. 6% of the windows assessed, and 25% of rooms assessed, meet the BRE criteria for VSC and NSL daylight respectively in the baseline scenario. This places a high burden on the Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes. This is evidenced by the fact the average baseline VSC level is 14.08%, and the average level with the proposal built out is 11.81% VSC.
- 8.138. For VSC daylight, 96 windows which do not meet the BRE criteria are bedrooms, which the BRE consider as having a lesser requirement for daylight than principal, habitable rooms. This means that 74 windows which serve living kitchen diners do not meet the VSC daylight criteria, which represents just 16% of windows which are subject to assessment.
- 8.139. Similarly, for NSL daylight, 94 rooms which do not meet the BRE criteria are bedrooms, which the BRE considered to have a lesser requirement for daylight. As such, eight living kitchen diners do not meet the NSL daylight criteria, which represents 4% of rooms assessed to this receptor. This is a small proportion relative to the receptor as a whole, and therefore considered minor.
- 8.140. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.141. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has low baseline daylight levels, which places a high burden on the Site to maintain existing levels;
 - The average VSC daylight levels are reduced from 14.08% to 11.81% with the Proposed Development in place, which is a minor reduction; and
 - Several of the affected windows and rooms are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.

Castlegate

- 8.142. A total of 139 windows serving 100 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.143. For VSC, 43 (31%) of the 139 windows meet the BRE criteria. 13 of the affected windows will experience an alteration between 20-30%, 23 of the affected windows will experience an alteration between 30-40%, and the remaining 60 windows will experience alterations in excess of 40% from the baseline value.
- 8.144. For NSL, 50 (50%) of the 100 rooms assessed will meet the BRE criteria. 22 of the affected rooms will experience an alteration between 20-30%, 17 of the affected rooms will experience an alteration between 30-40%, and the remaining 11 rooms will experience alterations in excess of 40% from the Baseline value.
- 8.145. The design of Castlegate is a material consideration to understand the results in context. The design of the building is such that a number of deep, single aspect rooms with overhanging or inset balconies face the Site. These balconies constrain the level of daylight received to windows and rooms so, despite the Site being underdeveloped in context to the emerging scale and massing in the locality, the baseline levels are low, and only 5% of windows currently meet the VSC daylight criteria. This places a high burden on the Site to maintain existing levels, and it means that relatively small changes in daylight levels represent large proportional changes. This is evidenced by the fact the average baseline VSC level is 14.11%, and the average level with the proposal built out is 10.32% VSC.
- 8.146. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.147. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is designed such that several deep, single aspect rooms with overhanging or inset balconies overlook the Site;
 - The property has low baseline daylight levels, and only 5% of windows meet the VSC daylight criteria, which places a high burden on the Site to maintain existing levels; and
 - The average VSC daylight levels are reduced from 14.11% to 10.32% with the Proposed Development in place, which is a minor reduction.

Citygate

- 8.148. A total of 177 windows serving 116 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.149. For VSC, 177 (100%) of the 177 windows meet the BRE criteria. For NSL, 116 (100%) of the 116 rooms assessed will meet the BRE criteria.
- 8.150. The effect on daylight to this property is therefore considered **negligible** and **not significant**.

Blade

- 8.151. A total of 470 windows serving 282 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.152. For VSC, 342 (73%) of the 470 windows meet the BRE criteria. 79 of the affected windows will experience an alteration between 20-30%, 49 of the affected windows will experience an alteration between 30-40%, and no windows will experience alterations in excess of 40% from the baseline value.
- 8.153. For NSL, 282 (100%) of the 282 rooms assessed will meet the BRE criteria.
- 8.154. This property is currently under construction and is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.155. Furthermore, the Site is underdeveloped in the baseline scenario, meaning the proposed apartments overlooking the Site benefit from unusually high baseline daylight levels of 30.13% against a target of 27%. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, future occupants will have an expectation of high-density development coming forward.
- 8.156. Notwithstanding, Blade will retain average VSC daylight levels of 26.14% with the Proposed Development in place. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered to be excellent.
- 8.157. Finally, the majority of windows (79) are reduced by 20-30%, which is minor, the remaining 49 windows are reduced by 30-40%, which is moderate, and none of the windows are reduced by in excess of 40%.
- 8.158. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.159. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property fully accords with the BRE target criteria for NSL daylight;
 - The property has unusually high baseline daylight levels given the underdeveloped nature of the Site;
 - The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF;
 - The property will retain average VSC daylight levels of 26.14%, which is excellent given its location and emerging height and density in the area; and
 - None of the affected windows experience a major reduction and the majority of reductions are minor in magnitude.

Three60

- 8.160. A total of 864 windows serving 384 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.161. For VSC, 121 (14%) of the 864 windows meet the BRE criteria. 70 of the affected windows will experience an alteration between 20-30%, 149 of the affected windows will experience an alteration between 30-40%, and the remaining 524 windows will experience alterations in excess of 40% from the baseline value.
- 8.162. For NSL, 281 (73%) of the 384 rooms assessed will meet the BRE criteria. 95 of the affected rooms will experience an alteration between 20-30%, eight of the affected rooms will experience an alteration between 30-40%, and no rooms will experience alterations in excess of 40% from the Baseline value.
- 8.163. Similarly to Blade, this property is currently under construction and is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.164. Furthermore, the Site is underdeveloped in the baseline scenario, meaning the proposed apartments overlooking the Site benefit from unusually high baseline daylight levels of 33.50% against a target of 27%. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, future occupants will have an expectation of high-density development coming forward.
- 8.165. Notwithstanding, Three60 will retain average VSC daylight levels of 18.77% with the Proposed Development in place. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered acceptable and commensurate with other successful residential developments in Manchester.
- 8.166. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.167. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property has unusually high baseline daylight levels given the underdeveloped nature of the Site;
 - The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF; and
 - The property will retain average VSC daylight levels of 18.77%, which is acceptable and commensurate with its location in an area of emerging height and density.

Elizabeth Tower

- 8.168. A total of 1,034 windows serving 538 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.169. For VSC, 719 (70%) of the 1,034 windows meet the BRE criteria. 87 of the affected windows will experience an alteration between 20-30%, 191 of the affected windows will experience an alteration between 30-40%, and the remaining 37 windows will experience alterations in excess of 40% from the baseline value.
- 8.170. For NSL, 499 (93%) of the 538 rooms assessed will meet the BRE criteria. 11 of the affected rooms will experience an alteration between 20-30%, 28 of the affected rooms will experience an alteration between 30-40%, and no rooms will experience alterations in excess of 40% from the baseline value.
- 8.171. Elizabeth Tower comprises an earlier phase of the Great Jackson Street Development Framework. As such, as the Site has been proposed for redevelopment in the SRF for several years, the residents of Elizabeth Tower will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in daylight levels to Elizabeth Tower have always been anticipated.
- 8.172. Notwithstanding, Elizabeth Tower will retain average VSC daylight levels of 19.64% with the Proposed Development in place. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered acceptable and commensurate with other successful residential developments in Manchester.
- 8.173. Furthermore, the BRE state that where a room is served by multiple windows of a similar size, the mean VSC can be calculated. Several rooms in Elizabeth Tower are served by multiple windows and, when the overall VSC for the rooms in the property is calculated, 405 (75%) of the 538 rooms which are subject to assessment meet the BRE target criteria. Additionally, as only 39 rooms do not meet the NSL target, this suggests that the rooms to Elizabeth Tower will remain well-lit despite reductions in VSC daylight.
- 8.174. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.175. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property forms part of the Great Jackson Street Development Framework, meaning the levels of daylight were never intended to be permanent;
 - The property will retain average VSC daylight levels of 19.64%, which is acceptable and commensurate with its location in an area of emerging height and density;
 - Despite VSC daylight reductions to windows, a greater proportion of rooms meet the overall VSC daylight criteria; and
 - A small proportion of rooms do not meet the NSL daylight criteria which, when considered in tandem with the VSC room criteria, means the rooms will remain well-lit internally.

School House, Jackson Crescent

- 8.176. A total of 18 windows serving 18 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.177. For VSC, six (33%) of the 18 windows meet the BRE criteria. 12 of the affected windows will experience an alteration between 20-30%, none of the affected windows will experience an alteration between 30-40%, and no windows will experience alterations in excess of 40% from the baseline value.
- 8.178. For NSL, 17 (94%) of the 18 rooms assessed will meet the BRE criteria. One room will experience an alteration between 20-30% from the baseline value.
- 8.179. All of the windows that do not meet the VSC target criteria are bedrooms, which the BRE consider as having a lower requirement for daylight. The room which does not meet the NSL daylight target criteria is also a bedroom. Furthermore, all of the windows and rooms are impacted to a minor degree.
- 8.180. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.181. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property will fully accord with the BRE target criteria for NSL daylight;
 - All of the windows which do not meet the VSC daylight criteria serve bedrooms, which the BRE consider as having a lesser requirement for daylight; and
 - All of the windows are reduced by between 20-30%, which is minor, and the worst affected window is reduced by 24.5% against a target of 20%.

Plot F, Great Jackson Street

- 8.182. A total of 2,402 windows serving 1,702 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.183. For VSC, 1,288 (54%) of the 2,402 windows meet the BRE criteria. 241 of the affected windows will experience an alteration between 20-30%, 242 of the affected windows will experience an alteration between 30-40%, and the remaining 631 windows will experience alterations in excess of 40% from the baseline value.
- 8.184. For NSL, 1,508 (93%) of the 1,702 rooms assessed will meet the BRE criteria. 99 of the affected rooms will experience an alteration between 20-30%, 33 of the affected rooms will experience an alteration between 30-40%, and the remaining 62 rooms will experience alterations in excess of 40% from the Baseline value.
- 8.185. This property is consented but not under construction, so is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.186. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the future residents of Plot F, Great Jackson Street will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in daylight levels to the property have always been anticipated.
- 8.187. Notwithstanding, Plot F, Great Jackson Street will retain average VSC daylight levels of 19.62% with the Proposed Development in place, which is reduced from 22.61% in the baseline scenario. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered acceptable and commensurate with other successful residential locations in the city centre. It should also be noted that the reduction in average VSC levels is less than the 20% BRE target.
- 8.188. Additionally, 575 windows which do not meet the VSC criteria, and 109 of the rooms which do not meet the NSL criteria, are bedrooms, which the BRE consider as having a lesser requirement for daylight than principal, habitable rooms.
- 8.189. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.190. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF; and
 - The property will retain average VSC daylight levels of 19.62%, which is acceptable and commensurate with its location in an area of emerging height and density.
 - Retained VSC daylight levels are reduced by less than 20% with the Proposed Development in place, which is considered minor; and
 - Several of the windows and rooms which do not meet the BRE target criteria are bedrooms, which are considered by the BRE as having a lesser requirement for daylight.

Plot G, Great Jackson Street

- 8.191. A total of 4,394 windows serving 1,355 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.192. For VSC, 3,861 (88%) of the 4,394 windows meet the BRE criteria. 528 of the affected windows will experience an alteration between 20-30%, five of the affected windows will experience an alteration between 30-40%, and no windows will experience alterations in excess of 40% from the baseline value.
- 8.193. For NSL, 1,279 (94%) of the 1,355 rooms assessed will meet the BRE criteria. 39 of the affected rooms will experience an alteration between 20-30%, 23 of the affected rooms will experience an alteration between 30-40%, and the remaining 14 rooms will experience alterations in excess of 40% from the Baseline value.
- 8.194. Similarly to Plot F, Great Jackson Street, this property is consented but not under construction, so is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.195. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the future residents of Plot G, Great Jackson Street will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in daylight levels to the property have always been anticipated.
- 8.196. Notwithstanding, of the 533 windows which do not meet the VSC target criteria, 528 are reduced by between 20-30%, which is a minor reduction. Furthermore, only 76 windows do not meet the NSL daylight criteria, which represents 5% of rooms which were assessed, 39 of which are reduced to a minor degree of between 20-30%. 23 rooms are reduced by 30-40% and 14 are reduced by in excess of 40%, meaning 37 (2%) of rooms assessed experience greater than a minor reduction.
- 8.197. Furthermore, Plot G, Great Jackson Street will retain average VSC daylight levels of 21.22% with the Proposed Development in place, which is reduced from 23.06% in the baseline scenario. Considering the Site context and anticipation that lower daylight and sunlight levels are to be expected given the emerging height and density in the area, this is considered acceptable and commensurate with other successful residential locations in the city centre. It should also be noted that the reduction in average VSC levels is less than the 20% BRE target.
- 8.198. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.199. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF;
 - The property will retain average VSC daylight levels of 21.22%, which is acceptable and commensurate with its location in an area of emerging height and density.
 - The majority of reductions to VSC daylight are minor, 5% of rooms assessed do not meet the NSL target and only 2% experience a greater than minor reduction; and
 - Retained VSC daylight levels are reduced by less than 20% with the Proposed Development in place, which is considered minor.

Deansgate South

- 8.200. A total of 204 windows serving 186 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.201. For VSC, none (0%) of the 204 windows meet the BRE criteria. 12 of the affected windows will experience an alteration between 20-30%, 54 of the affected windows will experience an alteration between 30-40%, and the remaining 138 windows will experience alterations in excess of 40% from the baseline value.
- 8.202. For NSL, 15 (8%) of the 186 rooms assessed will meet the BRE criteria. 23 of the affected rooms will experience an alteration between 20-30%, 41 of the affected rooms will experience an alteration between 30-40%, and the remaining 107 rooms will experience alterations in excess of 40% from the Baseline value.
- 8.203. 182 of the 204 windows which do not meet the VSC daylight criteria serve bedrooms, which the BRE considers as having a lesser requirement for daylight. Additionally, 156 of the 171 rooms which do not meet the NSL target criteria are bedrooms.
- 8.204. This property is consented but not under construction, so is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.205. The use as student accommodation is also a key consideration to understanding the results in context. Student occupants are typically more transient than traditional residential occupiers as their university terms generally run from September to June, so they will not be in occupation for the entire year. As such, when it is constructed and occupied, the provision of study spaces, a gym and wellbeing suite at ground and mezzanine floor levels also means they have the option to use other habitable space within the building. Bedrooms are also designed with a desk adjacent to the main window, which means they will consistently receive adequate daylight to this area.
- 8.206. As such, despite the numerical reductions against the target criteria, this property has a much-reduced sensitivity given that it is not yet constructed or occupied, and the future residents will be transient and typically short-term occupants.
- 8.207. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.208. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF;
 - The majority of affected windows and rooms are bedrooms, which the BRE consider as having a lesser requirement for daylight; and
 - The proposed use as student accommodation further reduces the sensitivity of the property as students are in occupation on a relatively short-term basis and are provided with alternative habitable accommodation within the building.

Bridgewater House

- 8.209. A total of 139 windows serving 94 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.210. For VSC, 58 (42%) of the 139 windows meet the BRE criteria. Nine of the affected windows will experience an alteration between 20-30%, two of the windows will experience an alteration between 30-40% and 70 windows will experience an alteration in excess of 40% from the baseline value.
- 8.211. For NSL, 54 (57%) of the 94 rooms assessed will meet the BRE criteria. Two of the affected rooms will experience an alteration between 20-30%, three of the affected rooms will experience an alteration between 30-40% and the remaining 35 rooms will experience alterations in excess of 40% from the Baseline value.
- 8.212. This property is recently consented but not under construction, so is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower daylight levels should be anticipated given the height and density of the surroundings.
- 8.213. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the future residents of Bridgewater House will have an expectation of high-density development coming forward. Bridgewater House also has very low baseline levels, and none of the windows assessed meet the VSC daylight criteria without the proposed development in place. This places a high burden on the Site to maintain already low levels, particularly given that it is a low-rise building in an area of emerging height and density.
- 8.214. Notwithstanding, 27 of the windows that do not meet the VSC daylight criteria, and 21 of the rooms which do not meet the NSL daylight criteria, are bedrooms, which the BRE consider as having a lesser requirement for daylight.
- 8.215. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **moderate adverse**.
- 8.216. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is not yet constructed, and it therefore has a lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF; and
 - The building has low baseline levels which places a burden on the Site to maintain them, particularly given that it is a low-rise building in an area of emerging height and density.

Crown Street Primary School

- 8.217. A total of 48 windows serving 16 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.
- 8.218. For VSC, 26 (54%) of the 48 windows meet the BRE criteria. 11 of the affected windows will experience an alteration between 20-30%, four of the affected windows will experience an alteration between 30-40%, and seven windows will experience alterations in excess of 40% from the baseline value.
- 8.219. For NSL, 15 (94%) of the 16 rooms assessed will meet the BRE criteria. The one affected room will experience an alteration between 20-30% from the Baseline value.
- 8.220. The BRE guidance is primarily intended to be used to assess daylight to dwellings. However, the guidance may also be applied to existing non-domestic buildings which have a reasonable expectation for daylight, such as schools, although this is not its foremost intention. As such, educational establishments are less sensitive to changes in daylight than residential dwellings.
- 8.221. Crown Street Primary School has very low baseline levels, and none of the windows and just four of the rooms assessed meet the VSC and NSL daylight criteria respectively without the proposed development in place. This is due to its low scale relative to the height and density in the area, which places a high burden on the development site to maintain already low levels of daylight.
- 8.222. Notwithstanding, the largest absolute change in VSC daylight is 5.8%, which is marginally greater than the 20% reduction which would not be considered noticeable were the windows currently achieving the 27% recommended VSC target. All other VSC reductions are below this and within 20% of the baseline figure. Finally, the room which does not meet the NSL daylight target is reduced by 20-30%, which is minor.
- 8.223. Overall, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on daylight to this property is considered to be **minor adverse**.
- 8.224. Using professional judgement to determine the significance, the effect on daylight is considered **not significant** in EIA terms for the following reasons:
- The property is an educational building not a residential dwelling, so it has a lower sensitivity to changes in daylight;
 - Additionally, the property is not yet constructed, which adds to its lower sensitivity to changes in daylight;
 - Future occupants will not be aware of any reductions in daylight and will anticipate lower daylight levels due to the proposals set out in the SRF;
 - The property has low baseline levels given its height relatively to the emerging density in the locality, which places a burden on the Site to maintain them; and
 - All but one of reductions to VSC daylight are within 20% of the baseline figure.

Sunlight to Surrounding Sensitive Receptors

- 8.225. The Full Proposed Development Sunlight results can be found within Appendix 8.2 and are summarised in Tables 8.7 and 8.8 below.
- 8.226. A total of 2,166 living rooms were assessed for sunlight within 14 buildings considered sensitive receptors.
- 8.227. Windows that are not within 90 degrees of due south, or do not serve living rooms, were excluded from the assessment.
- 8.228. The buildings are discussed in more detail below.

Table 8.7 – 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
Hill Quays	87	87	0	0	0
Lumiere	56	56	0	0	0
Deansgate Square	913	638	36	50	189
City South	15	15	0	0	0
Deansgate Quay	24	17	0	0	7
Castle Wharf	100	85	0	5	10
Castlegate	7	3	4	0	0
Castle Quay	12	10	2	0	0
Blade	47	47	0	0	0
Three60	96	96	0	0	0
Elizabeth Tower	195	195	0	0	0
Plot F, Great Jackson Street	368	368	0	0	0
Plot G, Great Jackson Street	185	185	0	0	0
Deansgate South	21	21	0	0	0
Bridgewater House	25	3	0	0	22
Crown Street Primary School	15	12	0	0	3
Total	2,126	1,838	42	55	231

Table 8.8 – Summary of Winter Sunlight Results

Address	Winter PSH				
	Total No. of Rooms	No. of Rooms That Meet BRE	Below threshold for Total APSH		
			Minor Adverse	Moderate Adverse	Major Adverse
Hill Quays	87	87	0	0	0
Lumiere	56	56	0	0	0
Deansgate Square	913	621	0	0	292
City South	15	15	0	0	0
Deansgate Quay	24	17	0	0	7
Castle Wharf	100	83	0	0	17
Castlegate	7	3	0	0	4
Castle Quay	12	10	0	0	2
Blade	47	47	0	0	0
Three60	96	96	0	0	0
Elizabeth Tower	195	195	0	0	0
Plot F, Great Jackson Street	368	368	0	0	0
Plot G, Great Jackson Street	185	185	0	0	0
Deansgate South	21	21	0	0	0
Bridgewater House	25	9	0	1	15
Crown Street Primary School	15	12	0	0	3
Total	2,126	1,825	0	1	340

Hill Quays

- 8.229. A total of 87 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.230. 87 (100%) of the 87 rooms meet the BRE criteria for annual and winter PSH.
- 8.231. The effect on daylight to this receptor is therefore considered to be **negligible**.

Lumiere

- 8.232. A total of 56 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.233. 56 (100%) of the 56 rooms meet the BRE criteria for annual and winter PSH.
- 8.234. The effect on daylight to this receptor is therefore considered to be **negligible**.

Deansgate Square

- 8.235. A total of 913 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.236. 541 (59%) of the 913 rooms meet the BRE criteria. For annual PSH, 36 of the affected rooms will experience an alteration between 20-30%, 50 of the affected rooms will experience an alteration between 30-40%, and the remaining 189 rooms will experience alterations in excess of 40% from the baseline value.
- 8.237. For winter PSH, 292 rooms will experience an alteration in excess of 40% from the baseline value.
- 8.238. As discussed previously, the existing Site conditions are a material consideration in understanding the impacts on Deansgate Square in context. The Site is underdeveloped in the baseline scenario, meaning the apartments in this receptor overlooking the Site benefit from higher baseline sunlight levels than would typically be expected in a city centre environment. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the residents of Deansgate Square will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in sunlight levels to Deansgate Square have always been anticipated.
- 8.239. As such, given the context of the area, this receptor will continue to receive good levels of sunlight once the Proposed Development is in place. This is evidenced by reviewing the average APSH figures for the rooms which do not meet the BRE target criteria. Despite not meeting the APSH target, the rooms will average 19.11% APSH with the Proposed Development in place, against a target of 25%. This only considers those rooms which do not meet the target criteria and, when considering all of the rooms which have been assessed, the average annual PSH will be 37.91%. This is excellent given the context of the Site.
- 8.240. Whilst there are some deviations from the BRE criteria, these are limited in relation to the receptor as a whole, and therefore considered appropriate given the location and context of the Site.
- 8.240.1. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on sunlight to this property is considered to be **moderate adverse**.

City South

- 8.241. A total of 15 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.242. 15 (100%) of the 15 rooms meet the BRE criteria for annual and winter PSH.
- 8.243. The effect on daylight to this receptor is therefore considered to be **negligible**.

Deansgate Quay

- 8.244. A total of 24 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.245. 17 (71%) of the 24 rooms meet the BRE criteria. For annual PSH, seven rooms will experience alterations in excess of 40% from the baseline value.
- 8.246. For winter PSH, seven rooms will experience an alteration in excess of 40% from the baseline value.
- 8.247. The property has low baseline sunlight levels, and only two of the 22 rooms assessed currently meet the annual and winter PSH criteria. The design of Deansgate Quay is a contributing factor to the low baseline levels, as rooms facing the Site are typically single aspect with deep floorplates, and several rooms are located beneath balconies, which places a high burden on the Site.
- 8.248. Due to the low baseline figures, all of the rooms which do not meet the annual PSH receive baseline levels below the target, whilst all but two rooms for winter PSH do not meet the baseline criteria, thus making it difficult for the Proposed Development to comply with the target criteria given the context of the Site and emerging height and density in the locality.
- 8.248.1. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality and the alternative benchmarking appropriate in Manchester city centre, the effect on sunlight to this property is considered to be **moderate adverse**.

Castle Wharf

- 8.249. A total of 100 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.250. 82 (82%) of the 100 rooms meet the BRE criteria. For annual PSH, five rooms will experience an alteration between 30-40% and the remaining 10 rooms will experience alterations in excess of 40% from the baseline value.
- 8.251. For winter PSH, 17 rooms will experience an alteration in excess of 40% from the baseline value.
- 8.252. Seven rooms assessed to this property receive baseline annual PSH levels of 9% or lower, which places a burden on the Site to maintain existing sunlight levels. Given the context of the Site and the emerging height and density in the area, this is difficult. Notwithstanding, with the Proposed Development in place, seven rooms will receive in excess of 19% annual PSH, which is considered appropriate in context to the locality and commensurate with other successful residential developments in Manchester.
- 8.253. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality, assessment against the Great Jackson Street Development Framework and nature of effects, the effect on daylight to this property is considered to be **moderate adverse**.

Castlegate

- 8.254. A total of seven rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.255. Four (43%) of the seven rooms meet the BRE criteria. For annual PSH, four rooms will experience an alteration between 20-30%.
- 8.256. For winter PSH, four rooms will experience an alteration in excess of 40% from the baseline value.
- 8.257. The design of Castlegate is a material consideration to understand the results in context. The design of the building is such that a number of deep, single aspect rooms with overhanging or inset balconies face the Site. These balconies constrain the level of sunlight received to rooms so, despite the Site being underdeveloped in context to the emerging scale and massing in the locality, the baseline levels are low, one room assessed currently meets the annual and winter PSH target. This places a burden on the Site to maintain existing levels and, given the context of the area and emerging height and density in the locality, it is inevitable that low baseline levels will lead to deviations from the target criteria.

- 8.258. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality, assessment against the Great Jackson Street Development Framework and nature of effects, the effect on daylight to this property is considered to be **moderate adverse**.

Castle Quay

- 8.259. A total of 12 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.260. 10 (83%) of the 12 rooms meet the BRE criteria. For annual PSH, two rooms will experience an alteration between 20-30%.
- 8.261. For winter PSH, two rooms will experience an alteration in excess of 40% from the baseline value.
- 8.262. The number of rooms which do not meet the annual and winter PSH target is limited in relation to the property as a whole, and the remaining rooms will continue to receive sunlight levels well in excess of the target criteria. As such, the impact is considered minor.
- 8.263. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality, assessment against the Great Jackson Street Development Framework and nature of effects, the effect on daylight to this property is considered to be **minor adverse**.

Blade

- 8.264. A total of 47 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.265. 47 (100%) of the 47 rooms meet the BRE criteria for annual and winter PSH.
- 8.266. The effect on daylight to this receptor is therefore considered to be **negligible**.

Three60

- 8.267. A total of 96 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.268. 96 (100%) of the 96 rooms meet the BRE criteria for annual and winter PSH.
- 8.269. The effect on daylight to this receptor is therefore considered to be **negligible**.

Elizabeth Tower

- 8.270. A total of 195 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.271. 195 (100%) of the 195 rooms meet the BRE criteria for annual and winter PSH.
- 8.272. The effect on daylight to this receptor is therefore considered to be **negligible**.

Plot F, Great Jackson Street

- 8.273. A total of 368 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.274. 368 (100%) of the 368 rooms meet the BRE criteria for annual and winter PSH.
- 8.275. The effect on daylight to this receptor is therefore considered to be **negligible**.

Plot G, Great Jackson Street

- 8.276. A total of 185 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.277. 185 (100%) of the 185 rooms meet the BRE criteria for annual and winter PSH.
- 8.278. The effect on daylight to this receptor is therefore considered to be **negligible**.

Deansgate South

- 8.279. A total of 21 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.280. 21 (100%) of the 21 rooms meet the BRE criteria for annual and winter PSH.
- 8.281. The effect on daylight to this receptor is therefore considered to be **negligible**.

Bridgewater House

- 8.282. A total of 25 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.283. Three (12%) of the 25 rooms meet the BRE criteria. For annual PSH, 22 rooms will experience an alteration in excess of 40%
- 8.284. For winter PSH, one room will experience an alteration between 30-40% and 15 rooms will experience an alteration in excess of 40% from the baseline value.
- 8.285. This property is recently consented but not under construction, so is not yet occupied. As such, there are no occupants to notice any reduction in daylight brought about by the Proposed Development, and they will be aware at the time of taking occupation that the Site is proposed for redevelopment. This property therefore has a lower sensitivity to change and, in context to the Great Jackson Street Development Framework, lower sunlight levels should be anticipated given the height and density of the surroundings.
- 8.286. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the future residents of Bridgewater House will have an expectation of high-density development coming forward.
- 8.287. As such, whilst there are deviations from the BRE target criteria, they are considered acceptable given the lower sensitivity of the property and its low-rise nature in context to its surroundings.
- 8.288. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality, assessment against the Great Jackson Street Development Framework and nature of effects, the effect on daylight to this property is considered to be **moderate adverse**.

Crown Street Primary School

- 8.289. A total of 15 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.
- 8.290. 12 (80%) of the 15 rooms meet the BRE criteria. For annual PSH, three rooms will experience an alteration in excess of 40% from the baseline value.
- 8.291. For winter PSH, three rooms will experience an alteration in excess of 40% from the baseline value.
- 8.292. The number of rooms which do not meet the BRE criteria is limited. Furthermore, as the building is an educational establishment rather than a residential dwelling, it is less sensitive to changes in sunlight.
- 8.293. Overall, using professional judgement to determine the significance, considering the city centre location, emerging height and density in the locality, assessment against the Great Jackson Street Development Framework and nature of effects, the effect on daylight to this property is considered to be **minor adverse**.

Overshadowing to Surrounding Sensitive Receptors

- 8.294. Full results and drawings for the overshadowing analysis are included at Appendix 8.3, and the assessment is discussed in more detail below. A diagram showing the location of each amenity area assess is included in Figure 8.1.

Crown Street Phase 2

- 8.295. The amenity areas serving Crown Street Phase 2 were assessed for overshadowing. The amenity areas to this receptor will receive sunlight to 79% and 99% of their area in the baseline scenario. With the proposed development in place, the amenity areas will continue to receive sunlight to 73% and 99% of their area respectively.
- 8.296. The amenity areas will continue to receive two hours of direct sunlight on 21 March to in excess of 50% of their area with the Proposed Development in place and will therefore meet the BRE criteria for Sun Hours on Ground.
- 8.297. As such, using professional judgement to determine the significance, the effect on overshadowing to this amenity area is considered to be **negligible** and **not significant** in EIA terms.

Plot F, Great Jackson Street

- 8.298. The amenity areas serving Plot F, Great Jackson Street were assessed for overshadowing. The amenity areas to this receptor will receive sunlight to 71%, 7% and 42% of their area in the baseline scenario. With the proposed development in place, the amenity areas will receive 62%, 0% and 34% respectively. As such, two amenity areas will experience a reduction of less than 20% and therefore meet the BRE criteria for Sun Hours on Ground.
- 8.299. The remaining amenity area receives very low baseline sunlight levels, meaning that deviations from the target criteria are inevitable given the context of the Site and emerging height and density in the area. In any event, users of the amenity areas to Plot F, Great Jackson Street will have access to the other two spaces which will continue to receive sunlight in accordance with the BRE criteria.
- 8.300. As such, using professional judgement to determine the significance, the effect on overshadowing to this amenity area is considered to be **minor adverse** and **not significant** in EIA terms.

Deansgate Square

- 8.301. Three amenity areas serving Deansgate Square were assessed for overshadowing. The baseline levels for two amenity areas to Deansgate Square are low and receive 41% and 16% Sun Hours on Ground on 21 March without the Proposed Development in place. Given the context of the Site and emerging height and density in the locality, the reductions brought about by the Proposed Development are proportionally much greater than were these amenity areas to meet the published BRE targets in the baseline scenario.
- 8.302. The third amenity area receives 99% Sun Hours on Ground in the existing scenario and is reduced to 0% with the Proposed Development in place.

- 8.303. The existing Site conditions are a material consideration in understanding the impacts on Deansgate Square in context. The Site is underdeveloped in the baseline scenario, meaning the amenity area facing the Site benefits from much higher baseline daylight levels than would typically be expected in a city centre environment. Furthermore, as the Site has been proposed for redevelopment in the SRF for several years, the residents of Deansgate Square will have an expectation of high-density development coming forward. It was never proposed that the baseline conditions would remain permanently, and alterations in daylight levels to Deansgate Square have always been anticipated.
- 8.304. This assessment considers the Site in its current configuration. The extant consent on the Site is evidence that reductions in sunlight to this amenity area are acceptable, and we would expect an assessment comparing the two to result in similar reductions than anticipated by the extant consent.
- 8.305. As such, using professional judgement to determine the significance, the effect on overshadowing to this amenity area is considered to be **moderate adverse** and **not significant** in EIA terms.

Cumulative Effects

- 8.306. 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.
- 8.307. 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.
- 8.308. The following committed developments have been considered in the assessment:
- Blade
 - Three60
 - Plot F, Great Jackson Street
 - Plot G, Great Jackson Street
 - Deansgate South

Mitigation Measures

Demolition and Construction

- 8.309. The potential daylight and sunlight effects during demolition and construction have been scoped out, as per paragraph 8.24 and 8.25.
- 8.310. 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

- 8.311. Overall, the impact on daylight to the surrounding properties is considered negligible to moderate adverse and the impact on sunlight is considered negligible to moderate adverse. Factoring in matters identified through qualitative, site specific analysis, as set out in paragraphs 8.67 and 8.68, this is considered to result in effects which are not significant. Given the context of the Site and nature of effects, no further mitigation is considered necessary.

Residual Effects

Table 8.9 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase

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				
Reductions in daylight	Scoped out	-	--	-
Reductions in sunlight	Scoped out	-	--	-
Increased overshadowing	Scoped out	-	--	-

Table 8.10 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Reductions in daylight	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Reductions in sunlight	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Increased overshadowing	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)

Monitoring

8.312. No monitoring in respect to daylight, sunlight and overshadowing is required during the operational phase.

Reference List

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

- The National Planning Policy Framework (NPPF) updated on 20 July 2021. Ministry of Housing, Communities & Local Government
- The National Planning Practice Guidance (NPPG) – Making Efficient Use of Land, published on 29 November 2016, updated 22 July 2019. Ministry of Housing, Communities & Local Government
- Manchester’s Local Development Framework Core Strategy Development Plan Document – adopted on 11 July 2012. Manchester City Council
- Guide to Development in Manchester Supplementary Planning Document and Planning Guidance – adopted April 2007. Manchester City Council
- Littlefair, P J (2022). ‘Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice’. Building Research Establishment (BRE)
- EN17037:2018 Daylight in Buildings (May 2019). BSi British Standards
- Daylighting and window design: Lighting Guide LG10, published November 2014. CIBSE



	Figure:	8.1		
	Title:	Amenity areas to Deansgate Square		
	Project:	Crown Street Phase 3 and Plot D		
	Date:	April 2022	Scale:	NTS

9. Noise and Vibration

Introduction

- 9.1 This Chapter of the ES has been prepared by Fisher Acoustics Ltd and assesses the likely noise and vibration impacts of the Proposed Development upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these measures have been adopted.
- 9.2 This Chapter is accompanied by one technical appendix, an environmental noise study (appendix 9.1).
- 9.3 This author of this chapter has extensive experience in the acoustic design of large-scale residential and commercial developments. The Director of Fisher Acoustics is a Chartered Engineer, holds a First Class Bachelor of Engineering in applied acoustics and has 32 years post-graduate experience in acoustic consultancy.

Assumptions and Limitations

- 9.4 As part of the overall study of noise and vibration, a quantitative assessment of the potential noise levels generated by construction activities has been carried out. The assessment has been based on the potential construction programme and information received relating to the number and type of plant items expected on the Site over the construction programme.
- 9.5 It is possible that there may be variation between the assumed construction programme and the actual construction programme and that plant items may vary from those considered as part of this assessment. However, the risk is expected to be small, in that there is certainty regarding the broad demolition and construction tasks that must be undertaken and the plant items that will be required to undertake these tasks.

Legislative and Policy Context, Guidance

Legislation

- 9.6 The Control of Pollution Act 1974 contains powers for local authorities to deal with noise and vibration from construction and demolition sites. Prior consent for demolition and construction activities can be granted under Section 61 of the Act.
- 9.7 The Planning and Compulsory Purchase Act 2004 requires local authorities to draw up local development plans, setting the broad framework for acceptable development in their area and reconciling any potential conflicts. Under the Town and Country Planning Act 1990, and in their development management role, local planning authorities may attach conditions to Planning Consents which may include controls on the emission of noise. Advice on the use of these powers is given to English authorities in the light of the Governments Noise Policy Statement for England in the National Planning Policy Framework (July 2021).
- 9.8 The Environmental Protection Act 1990 provides the principal controls over so-called 'statutory nuisances', including noise emitted from premises so as to be prejudicial to health or a nuisance. Under the Act, local authorities have a duty to inspect their areas from time-to-time to detect nuisances and, subject to a discretion to defer for seven days, when satisfied that a statutory nuisance exists or is likely to occur or recur, to serve an abatement notice on the person responsible. They also have a duty to investigate any complaint made by a person living within their area. Businesses are able to rely on the provision of 'best practicable means' to attenuate noise sources, but failure to comply with a notice is a criminal offence. Local authorities

have a power of entry to private premises, power to seize noise-making equipment and powers to carry out works in default of Notices.

- 9.9 The Licensing Act 2003 establishes a scheme administered by local authorities for licensing premises which are used for the supply of alcohol, to provide ‘regulated entertainment’ or to provide ‘late night refreshment’. Licensing authorities are obliged to prevent public nuisance, e.g. through noise, via the use of appropriate conditions.

National Planning Policy

- 9.10 The National Planning Policy Framework (NPPF), published in July 2021 by the Ministry of Housing, Communities and Local Government ‘sets out the Government’s planning policies for England and how these should be applied’.
- 9.11 Paragraph 174 of the National Planning Policy Framework states that ‘Planning policies and decisions should contribute to 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”’.
- 9.12 Paragraph 185 of the National Planning Policy Framework states “Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation”.
- 9.13 The National Planning Policy Framework document cross references the ‘Explanatory Note to the Noise Policy Statement for England’. The ‘Noise Policy Statement for England’ (NPSE) was published by the Department for Environment Food and Rural Affairs in March 2010. The NPSE does not give suggested external noise criteria for commercial Developments. In the absence of specific criteria, reference shall be made in this document to established guidance and principles, as established in British Standards and the local planning policy.

National Planning Practice Guidance – Noise

- 9.14 ‘Planning Practice Guidance – Noise’ is a web-based resource provided by the Ministry of Housing, Communities and Local Government (last revision date 22 July 2019) which gives guidance on Planning considerations in relation to noise.
- 9.15 The document identifies the subjective grading of noise and the recommended actions and different effect levels, as reproduced in Table 9.1.

Table 0.1: Summary of noise exposure hierarchy based on average response

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or	No Observed Adverse Effect	No specific measures required

Perception	Examples of Outcomes	Increasing Effect Level	Action
	other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.		
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Local Planning Policy

Manchester's Local Development Framework – Core Strategy Development Plan 2012-2027

- 9.16 The local planning context is provided by Manchester's Local Development Framework, Core Strategy, Development Plan Document. The Document was adopted on 11th July 2012.
- 9.17 With regard to noise, Policy DM1, Development Management, states that 'all development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document: 'effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.'
- 9.18 Saved policy DC26.1 from the Unitary Development Plan states 'New noise-sensitive developments (including large-scale changes of use of existing land or buildings), such as housing, schools, hospitals or similar activities, will be permitted subject to their not being in locations which would expose them to high noise levels from existing uses or operations, unless the effects of the noise can realistically be reduced. In giving effect to this policy, the Council will take account both of noise exposure at the time of receiving a planning application and of any increase that may reasonably be expected in the foreseeable future'.

'Planning & Noise, Technical Guidance' issued by Manchester City Council, June 2022

- 9.19 'Planning & Noise, Technical Guidance', dated June 2022 has been issued by the Environmental Protection, Environmental Health and The Neighbourhoods Service sections of Manchester City Council. The document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development. Reference is also made in the document to the relevant supporting information and guidance documents that Developers are expected to refer to when submitting a planning application.
- 9.20 Planning & Noise, Technical Guidance' refers to the following guidance documents:
- BS 7385 (1990) Evaluation and measurement of vibration in buildings
 - BS 4142 (2014) Methods for rating and assessing industrial and commercial sound
 - BS 8233 (2014) Guidance on sound insulation and noise reduction for buildings
 - BS 6472 (2008) Guide to the evaluation of human exposure to vibration in buildings
 - BS 5228 (2009+A1:2014) Code of practice for noise and vibration control on construction and open sites
 - BS 7445-1 (2003) The description and measurement of environmental noise: Guide to quantities and procedures
 - BS 717-1 (2013) Acoustics. Rating of sound insulation in buildings and of building elements. Airborne sound insulation
 - National Planning Policy Framework (2012) (now on 2021 update)
 - National Planning Policy Guidance (2014)
 - Professional Practice Guidance (ProPG): Planning & Noise – New Residential Development Guidance (2017)
 - WHO (1999) Guidelines for Community Noise

Manchester Residential Quality Guidance, (Issue 01, March 2017)

- 9.21 Section 4 of 'Key Actions - Ensure Visual and Acoustic Privacy' of The Manchester Residential Quality Guidance states that 'Homes are places of retreat. Residents should be able to 'shut out' the external world and enjoy sleep without suffering from either external noise generated by traffic or the public realm; or from neighbouring homes, common spaces or other functions in the building'.

British Standards

BS 4142: 2014+A1:2019

- 9.22 BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound noise' details assessment methods to determine the likely effects on people inside or outside residential buildings of noise of an industrial nature such as fixed building services plant.

BS 5228: 2009+A1: 2014

- 9.23 BS 5228: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' provides guidance on significance criteria for construction noise.

BS 6472: 2008

- 9.24 BS6472-1: 2008 'Guide to evaluation of human exposure to vibration in buildings - part 1: Vibration sources other than blasting' provides guidance on typically acceptable limits for vibration within residential and office buildings during the day and night.

BS 8233: 2014

- 9.25 BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings' provides appropriate criteria for acceptable levels of noise within dwellings.

Other Guidance

Design Manual for Roads and Bridges

- 9.26 LA 111 Revision 2 'Noise and Vibration' of the Design Manual for Roads and Bridges (DMRB), issued May 2020 highlights methods for the assessment of traffic noise levels and advises on the impact magnitude of changes in noise levels.
- 9.27 The DMRB advises that the threshold criteria used for traffic noise assessment during the day is a permanent change in magnitude of 1 dB LA10,18h in the short term (i.e. on opening) or a 3 dB LA10,18h change in the long term (typically 15 years after project opening).
- 9.28 Furthermore, the DMRB also states that a change in noise level of 1 dB LA10,18h is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3 dB LA10,18h is equivalent to a 100% increase or a 50% decrease in traffic flow.

Assessment Methodology and Significance Criteria

- 9.29 In order to assess the potential environmental noise and vibration effects of the Proposed Development, the following methodology has been adopted:
- Liaison with Manchester City Council Environmental Health department to agree noise and vibration assessment methodologies;
 - Identification of significant existing noise and vibration sources and existing sensitive receptors and baseline monitoring locations;
 - Establishing by representative noise surveys the daytime and night time noise levels at and around the Site;
 - Calculation of noise and vibration levels likely to arise at the nearest sensitive receptors during construction phases using the procedures and guidance given in BS 5228-1: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites';
 - Review of measured noise climate at the Site in order to derive appropriate environmental noise limits for potential music noise egress from amenity areas and commercial units within the Proposed Development;
 - Review of measured noise climate at the Site in order to derive appropriate environmental noise limits for stationary building services plant serving the Proposed Development;
 - Interpretation of results and comparison of the likely noise levels with relevant national criteria and guidance for construction noise;
 - Where appropriate, formulation of proposals for controlling noise and vibration during the construction works, to be agreed with Manchester City Council Environmental Health department

9.30 In addition, potential impacts on the Proposed Development from the following principal local noise sources have been assessed:

- Traffic on local roads; and
- Noise from building services plant within the Proposed Development affecting the buildings within the development.

9.31 The existing nearby noise sensitive residential premises are described below and identified in Figure 9.1.

NSR1: Dwellings at Crown Street Phase 1

NSR2: Dwellings at Crown Street Phase 2

NSR3: Dwellings at Deansgate Square

9.32 In addition, there are nearby planning-approved developments that are expected to be completed and occupied prior to the completion of all construction activities relating to Crown Street Phase 3 and Great Jackson Street Plot D. These planning-approved developments may therefore become noise sensitive receptors over the course of the proposed construction programme and are described below.

NSR4: Dwellings at Great Jackson Street, Plot F

NSR5: Dwellings at Bridgewater House, Great Jackson Street

NSR6: Dwellings at Crown Street Phase 3

NSR7: Office at Great Jackson Street, Plot D

9.33 Whilst there are other receptors around the Site including a primary school within Crown Street Phase 2, these other receptors are at greater distances from the Site than the receptors identified above, with similar exposure to the existing noise sources in the areas and similar pre-existing ambient noise levels. Therefore, the achievement of acceptable noise levels at the assessed receptors would lead to acceptable noise level at receptors at a further distance from the Site.

9.34 There are no notable existing sources of potential vibration at or around the Site. Road traffic generates insignificant levels of groundborne vibration.

9.35 This Chapter includes the results of calculations of construction noise and vibration levels at the nearest residential properties to the Site and a comparison of these predicted noise levels with noise limits based on guidance given in BS 5228-1: 2009+A1:2014.

9.36 The results of environmental noise surveys around the Site and the determination of the likely environmental noise effect of the Proposed Development on the surrounding residential areas are presented.

9.37 Where applicable, noise mitigation options have also been recommended in order to limit construction noise effects. In addition, mitigation measures to achieve appropriate noise and vibration levels within the Proposed Development are discussed.

Construction Noise and Vibration

9.38 Annex E of BS 5228-1: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites' provides guidance on significance criteria for construction noise.

9.39 Example Method 1 within Annex E, termed the 'ABC Method' is for residential receptors only, and allows the setting of threshold noise levels above which a potential significant effect could be generated. For the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This noise level is then compared with the noise level at the receptor in question due solely to site operations. If the noise level originating from the site exceeds the appropriate category value, then a potential significant effect is indicated. Other project-specific factors, such as the number of receptors affected and the duration and character of the impact then need to be taken into consideration to determine if there is a significant effect. Table 9.2 gives the threshold values and explains how the method is applied.

Table 0.1: Example threshold of potential significant effect at dwellings

Assessment category and threshold value period	Threshold value (dB LAeq, T)		
	Category A ^A	Category B ^B	Category C ^C
Night time (23.00 - 07.00)	45	50	55
Evening and weekends ^D	55	60	65
Daytime (07.00 – 19.00)	65	70	75

NOTE 1: A potential significant effect is indicated if the LAeq, T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total LAeq, T noise level for the period increases by more than 3 dB due to site noise.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19.00 – 23.00 weekdays, 13.00 – 23.00 Saturdays and 07.00 – 23.00 Sundays

9.40 Example Method 2 within Annex E states that noise generated by construction activities of duration of one month or more is deemed to be potentially significant if the total noise (pre-construction ambient noise plus construction noise) exceeds the pre-construction ambient noise level by 5dB or more, subject to lower cut-off values during daytime, evening and night of 65dB, 55dB and 45dB LAeq respectively.

9.41 The criteria stated within example Method 2 are generally applicable to the following building types:

- Residential
- Hotels and hostels
- Religious
- Education
- Health and/or community

9.42 For office and residential buildings, BS5228-1: 2009+A1:2014 refers to the 1976 revision of Advisory Leaflet 72 'Noise control on building sites, published by the Department of the Environment, which states 'Noise

from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.....Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- 70 dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise
- 75 dB(A) in urban areas near main roads in heavy industrial areas’.

9.43 These limits are for daytime working outside living rooms and offices. In noise-sensitive situations, for example, near hospitals and educational establishments, and when working outside normal working hours, such as between 19.00 and 22.00 hours, the allowable noise levels from building sites will be less. A reduction of 10 dB(A) may often be appropriate’.

9.44 With reference to the above discussions, Table 9.3 summarises the suggested significance criteria for the rating of construction noise affecting the noise sensitive premises around the Site.

Table 0.2: Summary of construction noise impact magnitude

Negligible	Minor	Moderate	Major
Site noise is equal to the threshold value	Site noise is 3dB to 5dB greater than the threshold value	Site noise is 5dB to 10dB greater than the threshold value	Site noise is more than 10dB greater than the threshold value

9.45 Section B.2 and Table B.1 of Annex B of BS 5228-2: 2009+A1: 2014 ‘Code of practice for noise and vibration control on construction and open sites – Vibration’ provides guidance on human response to vibration. The vibration levels at which different effects may be perceived and their impact magnitude are summarised in Table 9.4.

Table 0.3: Guidance on Effects of Vibration Levels

Vibration Level (PPV)	Effect	Impact Magnitude
0.14 mm·s ⁻¹	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3 mm·s ⁻¹	Vibration might be just perceptible in residential environments.	Minor
1.0 mm·s ⁻¹	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Moderate
10 mm·s ⁻¹	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major

- 9.46 BS6472-1: 2008 'Guide to evaluation of human exposure to vibration in buildings - part 1: Vibration sources other than blasting' provides guidance on typically acceptable limits for vibration within residential and office buildings during the day and night.
- 9.47 Table 9.5 gives the applicable criteria from BS6472-1: 2008. The applicable assessment criterion is the 'Vibration Dose Value' (VDV). Values of VDV within certain ranges indicate the likelihood or otherwise of adverse comment from occupants of the building.

Table 0.4: Vibration Dose Value ranges which might result in various probabilities of adverse comment within residential buildings

Place and Time	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
	ms-1.75	ms-1.75	ms-1.75
Residential buildings 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

- 9.48 For offices, BS6472-1: 2008 advises that a multiplying factor of 2 should be applied to the above vibration dose values ranges for a 16 h day. BS6472-1: 2008 does not include recommendations relating to schools. However, it is considered appropriate to apply the same criteria to schools and offices

Vibration Effects on Buildings

- 9.49 Section B.3 and Table B.2 of Annex B of BS 5228-2: 2009+A1: 2014 'Code of practice for noise and vibration control on construction and open sites – Vibration' identifies the transient vibration levels above which cosmetic damage could occur. The guideline levels are reproduced in Table 9.6.

Table 0.5 Transient vibration guide values for cosmetic damage

Line (see Figure 9.2)	Type of Building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
2	Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

NOTE 1 Values referred to are at the base of the building.

NOTE 2 For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded

Operation Environmental Noise Impact

Building Services Noise

9.50 For noise of an industrial nature such as fixed building services plant, an assessment of the likely effects on people inside or outside residential buildings due to noise can be carried out using BS4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’.

9.51 The following acoustic parameters are described within BS4142: 2014+A1:2019:

- Specific Noise Level – the equivalent continuous A-weighted sound pressure level measured over a specified time period, Tr, at the assessment position with the specific noise source contribution, LAeq, Tr (i.e. the noise level due to the new noise source).
- Rating Level – the Specific Noise Level plus an adjustment for any characteristic noise features, LAr, Tr.
- Residual Noise Level – the equivalent continuous A-weighted sound pressure level measured when the specific noise does not contribute to the ambient noise.
- Background Noise level – measured for a specific duration, T, in the absence of the specific noise source, LA90,T.

9.52 To complete a BS4142 assessment of potential noise effects upon residential properties, it is necessary to obtain the Rating Level due to the sound source in question. The Rating Level is derived by adding corrections to the measured Specific Noise Level, if the noise source:

- is tonal (correction of 0dB to +6dB, depending on severity)
- contains distinct impulses (correction of 0dB to +9dB, depending on severity)
- is intermittent (correction of +3dB if applicable)
- is otherwise distinctive against the residual acoustic environment (correction of +3dB)

Where a sound source is strongly tonal and impulsive over the duration of the appropriate assessment period, a correction of +15 dB may apply.

9.53 The Rating Level can then be used in order to ascertain the likelihood of complaints due to industrial noise disturbance by subtracting the measured background noise level. The greater the positive difference, the greater the likelihood of complaints. Table 9.7 summarises the assessment method.

Table 0.6: BS4142: 2014+A1:2019 Assessment Method

Difference between Rating Level and Measured Background Level	Assessment
+10 dB or greater	Significant adverse impact
+5 dB	Indication of adverse impact, depending on context
0 dB or less	Indication of low impact, depending on context

- 9.54 Where a new noise source has not yet been introduced, a recommended specific noise level can be determined based on a knowledge of the existing background noise level.
- 9.55 BS 4142: 2014+A1:2019 recognises that where background and rating levels are low, the potential absolute noise levels at the sensitive receptor might be more relevant in assessing potential impact than a simple comparison of the rating level and background noise level.
- 9.56 In such instances, reference can be made to BS 8233: 2014 in order to determine appropriate external noise levels due to buildings services plant, such that acceptable noise levels are achieved inside buildings.
- 9.57 'Planning & Noise, Technical Guidance' issued by Manchester City Council gives guidance on the preferred approach to environmental noise assessments. With regard to external noise due to building services plant, Section 3.7.1.5 of the document states:
- 'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

Noise from Amenity Spaces and Commercial Units

- 9.58 Noise egress from the proposed amenity spaces and commercial units at the Proposed Development must be controlled to appropriate levels so as to avoid noise nuisance to existing sensitive receptors. With regard to entertainment venues, 'Planning & Noise, Technical Guidance' states:
- 'When considering the potential impact of a proposal for an entertainment venue, consultants should consider the overall noise level (LAeq) and the 63 Hz and 125 Hz octave band noise levels (Leq). Music noise in the 63 Hz and 125 Hz octave bands, which is often described as "bass noise", is particularly difficult to contain and the impulsive character of this low frequency music noise is particularly disturbing for local residents exposed to it.
 - A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:
 - Entertainment noise (LAeq) should be controlled to 5dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location.
 - A criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be: 'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq), respectively.
 - This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue'.

Intrusive Noise within Proposed Residential Dwellings

- 9.59 Internal noise levels within the proposed apartments must be appropriate for the intended use. BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings' provides appropriate criteria for acceptable levels of noise ingress within dwellings.
- 9.60 In particular, section 7.2.2 'Internal ambient noise levels in dwellings' of BS8233: 2014 states that 'In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4'. Table 9.8 identifies the guideline values.

Table 0.7: BS8233: 2014 intrusive noise criteria

BS8233: 2014 – Indoor ambient noise levels for dwellings			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq, 16 hours	-
Dining	Dining room / area	40 dB LAeq, 16 hours	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hours	30 dB LAeq, 16 hours

- 9.61 Note 7 of section 7.2.2 states that: ‘Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved’.
- 9.62 The pre-existing external Noise levels at the Site are above the WHO (World Health Organisation) external noise guideline levels and therefore, with reference to BS8233: 2014, the maximum recommended daytime intrusive noise level within the habitable rooms of the Proposed Development is 35 dB LAeq,(16 hours) to 40 dB LAeq,(16 hours), and the corresponding night time intrusive noise limit within bedrooms is 30 dB LAeq,(16 hours) to 35 dB LAeq,(8 hours). Additionally, the recommended daytime intrusive noise level within bedrooms of the Proposed Development is 35 dB LAeq(16 hours) to 40 dB LAeq(16 hours).
- 9.63 With regard to maximum night time noise levels within bedrooms, BS8233: 2014 states ‘regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,f} depending on the character and number of events per night. Sporadic noise events could require separate values’.
- 9.64 In the absence of a specific performance criterion within BS8233 for short-term noise maxima, reference can be made to guidance published by the WHO. In particular, the WHO publication ‘Guidelines for Community Noise’ (1999), from which the guidance given in BS8233: 2014 is itself derived, states that ‘for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than ten to fifteen times per night’.
- 9.65 With regard to noise ingress to residential dwellings, section 3.6 ‘National & International Standards’ of ‘Planning & Noise, Technical Guidance’ issued by the Environmental Protection Section of Manchester City Council, references both BS8233: 2014 and WHO ‘Guidelines for Community Noise’, but advises that 5dB relaxations of the internal noise criteria in these documents should not be assumed. The document states that ‘The Council has adopted the following noise limits for residential properties’:
- Living Rooms: Daytime (0700-2300 hrs) 35dB LAeq
 - Bedrooms: Daytime (0700-2300 hrs) 35dB LAeq
 - Bedrooms: Night time (2300-0700 hrs) 30dB LAeq, 45dB L_{Amax}
(ten excesses over 45dB L_{Amax} allowed per night)

Sensitivity of receptors

- 9.66 Table 9.9 presents the sensitivity criteria for receptors during the construction phase and the operational phase of the Proposed Development.

Table 0.8: Criteria to Determine Receptor Sensitivity

Sensitivity of Receptor	Description	Examples
High	Receptors where people or operations are particularly susceptible to noise or vibration	Residential dwellings, schools (during the daytime), hospitals, places of worship
Medium	Receptors of moderate to low sensitivity to noise or vibration, where it may cause some distraction or disturbance.	Conference facilities, hotels, offices
Low	Receptors of low sensitivity to noise or vibration, where it may cause mild distraction or disturbance.	Bars, cafes, restaurants, sports grounds
Negligible	Receptors where distraction or disturbance from noise or vibration is minimal	Un-occupied buildings, factories and working environments with existing high levels of noise, night clubs

Significance Criteria

9.67 The following terms have been used to describe the magnitude of noise and vibration impact:

- **Major:** Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area;
- **Moderate:** Noise impact can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life;
- **Minor:** Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life
- **Negligible:** no discernible effect on noise or in the character of the area.

9.68 In line with the guidance presented in Guidelines for Environmental Noise Impact Assessment, published by the Institute of Environmental Managements and Assessment in November 2014, the significance of an impact can be determined with reference to the impact significance matrix detailed in Table 9.10.

Table 0.9: Impact Significance Matrix

Magnitude	Sensitivity		
	High	Medium	Low
Major	Major	Major – Moderate	Moderate
Moderate	Major – Moderate	Major - Moderate	Moderate
Minor	Moderate	Moderate - Minor	Minor
Negligible	Negligible	Negligible	Negligible

9.69 A description of the magnitude terms given in Table 9.10 is given below:

- **Major:** Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area;
- **Moderate:** Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life;
- **Minor:** Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life
- **Negligible:** no discernible effect on noise or in the character of the area.

9.70 Moderate or Major impacts have been considered to be 'significant' in EIA terms and Minor and Negligible impacts have been considered to be 'not significant'.

Scenarios Tested

9.71 The scenarios to be tested under this Chapter are scenario 1 (baseline) and scenario 13 which involves all proposed phases of the Proposed Development to ensure that a worst case scenario with regard to cumulative noise levels is assessed.

Baseline Conditions

Noise

9.72 Surveys of the existing noise environment at the Site were carried out by Fisher Acoustics Ltd from 1430 hrs Friday 16 September 2022 to 1500 hrs on Wednesday 21 September 2022 and from 2255 hrs Thursday 29 September 2022 to 0040 hrs Friday 30 September 2022.

9.73 The measurement locations used during the surveys were suitable for the determination of the prevailing ambient noise level at the existing local sensitive buildings and for assessing the noise levels able to impact upon the façades of the Proposed Development. Measurement locations for the noise surveys are shown in Figure 9.3 and described below.

- Location 1: 9m from the kerb of Chester Road adjacent to the junction of Great Jackson Street and Chester Road, at a microphone height of 1.5 metres above site ground level
- Location 2: 3m from the west tower of Deansgate Square residences, at a microphone height of 1.5 metres above site ground level
- Location 3: 3m from the south tower of Deansgate Square residences, at a microphone height of 1.5 metres above site ground level
- Location 4: At location of closest façade of Proposed Development to Great Jackson Street, 1 metre in front of site hoarding), at a microphone height of 1.5 metres above site ground level
- Location 5: 5 metres from the kerb of Great Jackson Street at the proposed location of Plot C8, at a microphone height of 1.5 metres above site ground level
- Location 6: On the roof of the Crown Street marketing suite on Great Jackson Street at a microphone height of 9 metres above site ground level
- Location 7: 16 metres from the closest carriageway of the A57(M) (Mancunian Way) at a microphone height of 13.5 metres above site ground level
- Location 8: On Melbourne Street adjacent to the site boundary of Plot D, at 32 metres from the kerb of Great Jackson Street, at a microphone height of 1.5 metres above site ground level

9.74 The long-term noise environment at and around the Site is principally determined by road traffic on Mancunian Way (A57(M)) and Chester Road, with a contribution to noise levels from road traffic on Great Jackson Street.

9.75 The measured noise levels during the day and night at and around the Site are summarised in Table 9.11.

Table 0.1: Summary of measured environmental noise levels – existing and proposed receptors

Location	Measured Noise Level					
		Daytime (defined as 0700 to 2300)		Night time (defined as 2300 to 0700)		
	dB, LAeq	dB, LAmax	dB LA90	dB, LAeq	dB, LAmax	dB LA90
1 - Thursday 29 September 2022	71	79 to 85	60 to 67	69	59 to 84	48 to 65
2 - Thursday 29 September 2022	61	68 to 83	56 to 59	59	65 to 77	55 to 57
3 - Thursday 29 September 2022	61	61 to 83	58 to 60	60	70 to 78	56 to 59
4 – Friday 16 September 2022	64	73 to 80	57 to 60	-	-	-
4 – Thursday 29 September 2022	-	-	-	58	56 to 81	50 to 55
5 – Friday 16 September 2022	62	70 to 74	58 to 60	-	-	-
5 – Thursday 29 September 2022	-	-	-	60	61 to 76	53 to 57
6 – Friday 16 September 2022	62	66 to 84	58 to 62	60	61 to 80	54 to 60
6 – Saturday 17 September 2022	63	64 to 90	57 to 63	60	61 to 80	52 to 60
6 -Sunday 18 September 2022	62	61 to 94	54 to 61	59	60 to 77	51 to 60
6 -Monday 19 September 2022 (Bank Holiday)	61	63 to 91	55 to 60	58	59 to 77	47 to 62
6 -Tuesday 20 September 2022	65	65 to 94	57 to 66	59	60 to 78	48 to 63
6 -Wednesday 21 September 2022	66	68 to 88	61 to 69	-	-	-
7 (West Elevation, Plot D) - Friday 16 September 2022	76	76 to 93	67 to 77	74	74 to 90	56 to 75
7 – Saturday 17 September 2022	76	74 to 94	61 to 77	74	75 to 91	54 to 76
7 -Sunday 18 September 2022	76	76 to 98	55 to 77	73	73 to 98	49 to 75
7 -Monday 19 September 2022	76	75 to 99	60 to 76	73	68 to 92	46 to 77
7 -Tuesday 20 September 2022	77	76 to 99	64 to 78	73	72 to 97	47 to 77
7 -Wednesday 21 September 2022	77	77 to 100	71 to 78	-	-	-
8– Thursday 29 September 2022	-	-	-	61	62 to 67	56 to 61
6 -Sunday 18 September 2022	62	61 to 94	54 to 61	59	60 to 77	51 to 60

Vibration

- 9.76 There are no major sources of vibration in proximity to the Site. No adverse comment would be expected in any area of the Proposed Development due to existing levels of vibration due to the prevailing sources such as road vehicles.

Identification and Evaluation of Likely Significant Effects

Construction Noise & Vibration

- 9.77 There is the potential for environmental noise effects at the nearby sensitive premises from the following during the construction phase of the project:
- Clearing and excavation of site
 - Temporary addition to traffic flows on local roads due to construction traffic
 - Construction of Proposed Development
- 9.78 With reference to the guidance discussed above and the results of the noise surveys, the threshold values for potential significant effects are given in Table 9.12. The threshold value for potential significant effects at the Crown Street primary school under construction at the time of writing is the same as that for Crown Street Plots 4 and 5. As the school lies at a greater distance from the Proposed Development than Plots C4 and C5, the potential impact at the school will be no greater than at Plots C4 and C5.

Table 0.12: Threshold noise values for potential significant effect due to construction

Location	Threshold Values, daytime
	dB, L _{Aeq}
NSR1: Crown Street Phase 1, Victoria Residence (residential)	70
NSR2a: Crown Street Phase 2, Plot C4 (residential)	70
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	70
NSR3a: Deansgate Square, North Tower (residential)	70
NSR3b: Deansgate Square, West Tower (residential)	70
NSR3c: Deansgate Square, South Tower (residential)	70
NSR4: Great Jackson Street, Plot F1 (residential)	70
NSR5: Bridgewater House, Great Jackson Street (residential)	70
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	70
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	70
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	70

NSR6e: Crown Street, Phase 3, Plot C7, N & E elevations (residential)	70
NSR7: Great Jackson Street, Plot D (Offices)	75

- 9.79 In order to estimate the likely levels of noise from construction activities at the Site, calculations have been carried out using the methodologies and data given in BS5228: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites; Part 1 - Noise' and by applying corrections for distance attenuation (i.e. by how much noise reduces with increasing distance from the plant).
- 9.80 This exercise has been carried out for each major construction phase of the project in order to calculate the worst-case hourly noise level (LAeq,1hour) at each receptor.
- 9.81 The construction works will involve the operation on site of the following principal major plant items at certain stages of the construction works:
- Excavators;
 - Dumper trucks;
 - Continuous flight auger piling rigs;
 - Concrete pump;
 - Poker vibrators;
 - Tower cranes;
 - Hoists;
 - Telehandlers
- 9.82 With regard to construction traffic, given the overlapping construction phases there could be approximately one hundred vehicle movements to the Site per working day i.e. approximately twelve vehicles per hour to arrive and offload and then depart. This approximate number of vehicle movements may prevail over approximately two years of the construction programme, and in particular during the excavation works of the overlapping or sequential phases. The proposed entry point to the site for construction vehicles is via Garwood Street off Mancunian Way. The proposed exit point from the site is Chester Road via Great Jackson Street.
- 9.83 Table 9.13 identifies the calculated noise levels at the receptors identified above due to cumulative noise from construction noise sources at the Site during the main construction phases. The Table presents the worst case cumulative noise level on the assumption that all of the noisier mobile items of construction plant are situated at the section of the Site perimeter that is closest to the receptor in question. This situation will not prevail for an extended period of time, as the construction plant will move around the Site as each section of the works is completed. In addition, the typical expected noise level is presented given the location of plant items at more typical distances from the nearby receptors. It should be noted that the calculations at this stage do not include for any beneficial acoustic screening provided by any solid hoarding around the Site or by the local screening of individual plant items. An 'on' time of construction noise sources during each day of 50% has been assumed during the excavation and piling stage, and of 70% during the frame construction.
- 9.84 As some of the buildings of the Proposed Development will be completed and occupied before all of the proposed construction phases are completed, these buildings will themselves become noise sensitive receptors and have thus been included in the assessment of construction noise. However, none of the proposed buildings will be occupied before the piling operations of all proposed Phases have been completed.

Table 0.13: Calculated noise levels at sensitive receptors during construction phases

Receptor	Calculated noise levels during construction phase (dB LAeq)	
	Excavation/Piling worst case/typical	Frame Construction & Post Frame Construction worst case/typical
NSR1: Crown Street Phase 1, Victoria Residence (residential)	72 / 69	71 / 69
NSR2a: Crown Street Phase 2, Plot C4 (residential)	67 / 65	69 / 67
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	74 / 70	74 / 71
NSR3a: Deansgate Square, North Tower (residential)	72 / 67	72 / 68
NSR3b: Deansgate Square, West Tower (residential)	73 / 67	71 / 68
NSR3c: Deansgate Square, South Tower (residential)	73 / 68	72 / 68
NSR4: Great Jackson Street, Plot F1 (residential)	76 / 74	74 / 73
NSR5: Bridgewater House, Great Jackson Street (residential)	79 / 73	75 / 70
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	n/a	76 / 74
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	n/a	76 / 74
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	n/a	77 / 72
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	n/a	73 / 69
NSR7: Great Jackson Street, Plot D (Offices)	71 / 70	68 / 65

9.85 At other stages of the construction programme, the expected noise levels at the sensitive receptors will be lower than those given in Table 9.13, depending upon the ongoing processes and the stage of the build programme.

9.86 Table 9.14 shows the calculated excess over the threshold noise values for potential significant effect due to construction, if no mitigation measures are in place.

Table 9.14: Calculated excess over threshold noise values for potential significant effect, without mitigation

Receptor type and location	Calculated excess over construction noise target (dB LAeq)
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	Excavation/Piling worst case/typical	Frame & Post Frame Construction worst case/typical
NSR1: Crown Street Phase 1, Victoria Residence (residential)	2 / -1	1 / -1
NSR2a: Crown Street Phase 2, Plot C4 (residential)	-3 / -5	-1 / -3
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	4 / 0	4 / 1
NSR3a: Deansgate Square, North Tower (residential)	2 / -3	2 / -2
NSR3b: Deansgate Square, West Tower (residential)	3 / -3	1 / -2
NSR3c: Deansgate Square, South Tower (residential)	3 / -2	2 / -2
NSR4: Great Jackson Street, Plot F1 (residential)	6 / 4	4 / 3
NSR5: Bridgewater House, Great Jackson Street (residential)	9 / 3	5 / 0
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	n/a	6 / 4
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	n/a	6 / 4
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	n/a	7 / 2
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	n/a	3 / -1
NSR7: Great Jackson Street, Plot D (Offices)	-4 / -5	-7 / -10

9.87 The values given in Table 9.14 can be compared to the values given in Table 9.3 to determine the potential impact of construction noise, as summarised in Table 9.15.

Table 0.15: Potential impact of construction noise, without mitigation

Receptor type and location	Potential noise impact	
	Excavation/Piling worst case/typical	Frame & Post Frame Construction worst case/typical
NSR1: Crown Street Phase 1, Victoria Residence (residential)	Negligible	Negligible

NSR2a: Crown Street Phase 2, Plot C4 (residential)	Negligible	Negligible
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	Minor Adverse	Minor Adverse
NSR3a: Deansgate Square, North Tower (residential)	Negligible	Negligible
NSR3b: Deansgate Square, West Tower (residential)	Minor Adverse	Negligible
NSR3c: Deansgate Square, South Tower (residential)	Minor Adverse	Negligible
NSR4: Great Jackson Street, Plot F1 (residential)	Moderate Adverse	Minor Adverse
NSR5: Bridgewater House, Great Jackson Street (residential)	Moderate Adverse	Moderate Adverse
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	n/a	Minor Adverse
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	n/a	Moderate Adverse
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	n/a	Moderate Adverse
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	n/a	Minor Adverse
NSR7: Great Jackson Street, Plot D (Offices)	Negligible	Negligible

- 9.88 In the worst case with no mitigation, minor to moderate adverse effects are possible at the residential dwellings at Great Jackson Street Plot F1, Crown Street Plot C5, and Crown Street Plots C8 and E2.
- 9.89 Given the potential adverse effects, measures to mitigate construction noise would be appropriate.
- 9.90 As discussed in BS5228-2: 2014 'Code of Practice for noise and vibration control on construction and open sites', it is fully expected that the construction vibration levels would not be sufficient to cause structural damage to buildings around the Site.
- 9.91 Natural mitigation of potential ground borne vibration due to the proposed construction activities will be afforded to the residential buildings around the Site by virtue of the distance of these receptors from the works. Potential significant effects are not expected to arise on the basis that good communication is established between the Contractor and residents.
- 9.92 The impact of construction vibration on existing sensitive receptors is therefore expected to be minor to moderate adverse.

Operational Noise

Road Traffic

- 9.93 The Proposed Development would lead to changes in the traffic volumes on the roads surrounding the Site. Changes in traffic flows can lead to changes in the prevailing noise levels around the roads in question.
- 9.94 The expected changes in traffic flows as detailed within the transport Chapter contained within this ES due to the operation of the Proposed Development are summarised in Table 9.15.

Table 9.15: Summary of road traffic 24hr weekday flow changes

Approach Link	Expected change in traffic flow
A56 Chester Rd (E)	3.19%
Great Jackson Street	34.24%
A56 Chester Rd (W)	8.16%
A56 Chester Rd (E)	8.16%
A57 Mancunian Way (SB) On-Slip	5.07%
A57 Mancunian Way (South of Deans. Interchange)	4.28%
A57 Mancunian Way (NB) Off-Slip	1.19%
A5067 Chorlton Rd	0.34%
A56 Chester Rd (W)	1.59%
A57 Mancunian Way (NB) On-Slip	10.41%
A57 Mancunian Way (North of Deans. Interchange)	7.83%
A57 Mancunian Way (SB) Off-Slip	1.41%
Medlock Street (N)	2.27%
City Road East	27.08%
Medlock Street (S)	4.92%
Great Jackson Street (N)	26.34%
Melbourne Street	74.16%
Great Jackson Street (S)	28.41%
Mancunian Way, between Chester Rd and Medlock St	3.19%
Mancunian Way, east of Medlock St	34.24%
Princess Rd, south of Mancunian Way	8.16%

- 9.95 It can be seen that the greatest expected percentage increase in traffic flows on local roads is 74.16% on Melbourne Street. All other things being equal and with no contribution of noise from other roads, this change in traffic flow would lead to an increase in noise levels on Melbourne Street of 2.4 dB. However, as the absolute volume of traffic on Melbourne Street is low (typically less than three hundred vehicle movements per hour during daytime hours following the completion of the Proposed Development) and given the existing level of traffic noise at existing and proposed noise sensitive properties across the Great Jackson Street Masterplan area due to vehicle movements on the Mancunian Way (A57(M)), this change in traffic flow on Melbourne Street is expected to lead to an increase in noise levels on Melbourne Street of less than 1.0 dB.
- 9.96 The changes in traffic flows on other roads are minor and would lead to an increase in traffic noise due solely to traffic on the roads in question of less than 1.3dB. The potential long term changes in traffic noise levels due to the Proposed Development would be classed as negligible.

Building Services Plant

- 9.97 At this design stage, the specific total building services plant requirements for the various aspects of the Proposed Development are not known. However, noise limits for any and all building services plant can be established using published guidance.
- 9.98 In line with the assessment methodology detailed in BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound', in order to avoid potential noise nuisance at existing and proposed sensitive receptors, the cumulative Rating level due to all simultaneously operating non-emergency plant across the Proposed Development must be at least 5dB lower than the typical pre-existing background noise level at the nearest residential receptors to the site. Table 9.16 identifies the allowable combined free-field Rating levels at the nearest residential receptors. Given compliance with the noise limits in Table 9.16, the predicted noise effects would be negligible and therefore not significant.

Table 9.1: Cumulative environmental noise limits for non-emergency building services plant

Location	Rating Level, dB LAeq	
	Daytime (07:00hrs to 23:00hrs)	Night time (23:00hrs to 07:00hrs)
NSR1: Crown Street Phase 1, Victoria Residence (residential)	52	47
NSR2a: Crown Street Phase 2, Plot C4 (residential)	52	47
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	52	47
NSR3a: Deansgate Square, North Tower (residential)	52	51
NSR3b: Deansgate Square, West Tower (residential)	52	51
NSR3c: Deansgate Square, South Tower (residential)	52	51

Location	Rating Level, dB LAeq	
	Daytime (07:00hrs to 23:00hrs)	Night time (23:00hrs to 07:00hrs)
NSR4: Great Jackson Street, Plot F1 (residential)	52	45
NSR5: Bridgewater House, Great Jackson Street (residential)	52	45
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	52	45
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	52	45
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	52	45
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	52	45
NSR7: Great Jackson Street, Plot D	52	45

- 9.99 It is expected that any emergency plant items required at the Proposed Development, such as smoke extract fans and standby generators would only operate during emergencies and during periodical test runs (such as test runs of thirty minutes every two months). On this basis, it is not considered appropriate to require emergency plant to comply with the noise limits that would apply to continuously-operating non-emergency plant. It is therefore suggested that the noise level from any emergency plant is no more than 10dB(A) greater than the ambient noise level (measured as an LA90 noise level) at any proposed or existing residential receptor.
- 9.100 It is therefore recommended that the noise level at any residential façade during operation of any emergency plant does not exceed the daytime noise levels given in Table 9.17. Given compliance with the noise limits in Table 9.17, the predicted noise effects at each receptor would be negligible and therefore not significant.

Table 9.2: Cumulative environmental noise limits for emergency building services plant

Location	Noise Level, dB LAeq
	Daytime (07:00hrs to 23:00hrs)
NSR1: Crown Street Phase 1, Victoria Residence (residential)	67
NSR2a: Crown Street Phase 2, Plot C4 (residential)	67
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	67

NSR3a: Deansgate Square, North Tower (residential)	67
NSR3b: Deansgate Square, West Tower (residential)	67
NSR3c: Deansgate Square, South Tower (residential)	67
NSR4: Great Jackson Street, Plot F1 (residential)	67
NSR5: Bridgewater House, Great Jackson Street (residential)	67
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	67
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	67
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	67
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	67
NSR7a: Great Jackson Street, Plot D, north elevation	67
NSR7b: Great Jackson Street, Plot D, south elevation	70

Noise Egress from Amenity Spaces and Commercial Units

- 9.101 In order to avoid potential noise nuisance to existing noise sensitive receptors, activity noise egress from the proposed amenity spaces and commercial units within the Proposed Development must be controlled. As the proposed spaces may potentially employ music replay, suitable limits relating to music noise egress from the proposed areas must be established.
- 9.102 As detailed above, Manchester City Council suggests that external music noise levels (measured as an Leq noise level) external to a residential property due to an entertainment venue should be 5dB lower than the prevailing background noise level in each octave band. In some circumstances this requirement is more stringent than would be necessary to maintain residential amenity, as strict compliance with this criterion lead could lead to external music noise levels that would be below the threshold of human hearing. It is therefore suggested that external noise limits include a lower bound.
- 9.103 Table 9.18 identifies the maximum allowable cumulative daytime and night time free-field noise levels at the closest residential façades due to music noise from the proposed amenity spaces and commercial units to comply with the guidance of Manchester City Council. Given compliance with the noise limits in Table 9.18, the predicted noise effects at each receptor would be negligible and therefore not significant.

Table 9.3: Maximum allowable external music noise levels due to proposed amenity spaces and commercial units

Location/period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
NSR1: Crown St, Victoria Residence (0700 to 2300)	47	44	46	46	50	43	30
NSR1: Crown St, Victoria Residence (2300 to 0700)	47	40	42	42	45	38	26
NSR2a: Crown St Phase 2, Plot C4 (0700 to 2300)	47	44	46	46	50	43	30
NSR2a: Crown St Phase 2, Plot C4 (2300 to 0700)	47	40	42	42	45	38	26
NSR2b: Crown St Phase 2, Plot C5 (0700 to 2300)	47	44	46	46	50	43	30
NSR2b: Crown St Phase 2, Plot C5 (2300 to 0700)	47	40	42	42	45	38	26
NSR3a: Deansgate Sq, North Tower (0700 to 2300)	49	46	48	48	52	44	31
NSR3a: Deansgate Sq, North Tower (2300 to 0700)	49	46	48	48	46	39	29
NSR3b: Deansgate Sq, West Tower (0700 to 2300)	49	46	48	48	52	44	31
NSR3b: Deansgate Sq, West Tower (2300 to 0700)	49	46	48	48	46	39	29
NSR3c: Deansgate Sq, South Tower (0700 to 2300)	47	44	46	46	50	43	30
NSR3c: Deansgate Sq, South Tower (2300 to 0700)	50	50	52	50	47	40	30
NSR4: Great Jackson St, Plot F1 (0700 to 2300)	58	52	50	48	49	43	34
NSR4: Great Jackson St, Plot F1 (2300 to 0700)	47	40	40	40	45	36	22
NSR5: Bridgewater Hse, Great Jackson St (0700 to 2300)	47	44	46	46	50	43	30
NSR5: Bridgewater Hse, Great Jackson St (2300 to 0700)	47	40	42	42	43	36	23
NSR6a: Crown Street, Phase 3, Plot E1 (0700 to 2300)	47	44	46	46	50	43	30
NSR6a: Crown Street, Phase 3, Plot E1 (2300 to 0700)	47	40	42	42	43	36	23
NSR6b: Crown Street, Phase 3, Plot E2 (0700 to 2300)	47	44	46	46	50	43	30
NSR6b: Crown Street, Phase 3, Plot E2 (2300 to 0700)	47	40	42	42	43	36	23
NSR6c: Crown Street, Phase 3, Plot C8 (0700 to 2300)	47	44	46	46	50	43	30
NSR6c: Crown Street, Phase 3, Plot C8 (2300 to 0700)	47	40	42	42	43	36	23
NSR6d: Crown Street, Phase 3, Plot C7 (0700 to 2300)	47	44	46	46	50	43	30
NSR6d: Crown Street, Phase 3, Plot C7 (2300 to 0700)	47	40	42	42	43	36	23

Location/period	Sound Pressure Level (dB Leq)						
	@ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
NSR7a: Great Jackson Street, Plot D (0700 to 2300)	58	52	50	48	49	43	34
NSR7a: Great Jackson Street, Plot D (2300 to 0700)	47	40	40	40	45	36	22

Noise Affecting the Proposed Development

9.104 The sensitive areas of the Proposed Development that could be affected by the noise levels summarised in Table 9.11 above are the living rooms and bedrooms of the proposed apartments. An intrusive noise study is included in Appendix 9.1. This gives the minimum recommended sound insulation of the building facades to achieve the internal noise criteria of Table 9.8.

Mitigation Measures

Construction

9.105 The construction of a solid, close-boarded hoarding (2.4 metres high) around the majority of the Site is expected to be provided. This can be expected to reduce noise levels at local receptors by 0dB(A) to 5dB(A), depending upon the location of the noise source on Site and the height of the receptor.

9.106 In addition, the following recommendations must be followed to achieve appropriate reductions of construction noise.

- Noisy plant should be located so as to maximise the distances between the plant and the sensitive receptors.
- The works should be carried out in as timely a manner as possible in order to minimise the duration of any disturbance.
- Via communication between the Contractor and the Council, local residents should be kept informed of general construction activities, including working hours.
- Wherever possible, working hours should be restricted in line with Manchester City Council's typical requirements.
- Excavations in hard materials should use silenced and sensitively located compressors in conjunction with shrouded breakers.
- The drop height of materials into wagons shall be minimised.
- Any materials hoists used on the Site should be enclosed by hoarding at ground level and operated by mains electricity or via a silenced generator.
- Rubbish skips should be housed within enclosed areas that encompass the chute terminations. The materials unloading point should be enclosed.
- All reasonable steps should be taken to limit the number of vehicles waiting to deliver to the Site.
- All plant and equipment should be properly maintained.
- All plant and equipment should be operated in their minimum-noise modes with any manufacturer's silencers and covers properly in place.
- With the exception of enhanced generators, pumps and electric plant, all plant and equipment should be shut down when not in use.
- Vehicle movements should be arranged so as to minimise noise from reversing warning indicators.

9.107 Table 9.19 identifies the potential impact of construction noise at the noise sensitive receptors following the implementation of the above best practice mitigation measures.

Table 0.19: Potential impact of construction noise, with mitigation

Receptor type and location	Potential noise impact	
	Excavation/Piling worst case/typical	Frame Construction worst case/typical
NSR1: Crown Street Phase 1, Victoria Residence (residential)	Negligible	Negligible
NSR2a: Crown Street Phase 2, Plot C4 (residential)	Negligible	Negligible
NSR2b: Crown Street, Phase 2, Plot C5 (residential)	Negligible	Negligible
NSR3a: Deansgate Square, North Tower (residential)	Negligible	Negligible
NSR3b: Deansgate Square, West Tower (residential)	Negligible	Negligible
NSR3c: Deansgate Square, South Tower (residential)	Negligible	Negligible
NSR4: Great Jackson Street, Plot F1 (residential)	Negligible	Negligible
NSR5: Bridgewater House, Great Jackson Street (residential)	Minor Adverse	Negligible
NSR6a: Crown Street, Phase 3, Plot E1 (residential)	n/a	Negligible
NSR6b: Crown Street, Phase 3, Plot E2 (residential)	n/a	Negligible
NSR6c: Crown Street, Phase 3, Plot C8 (residential)	n/a	Negligible
NSR6d: Crown Street, Phase 3, Plot C7 (residential)	n/a	Negligible
NSR7: Great Jackson Street, Plot D (Offices)	Negligible	Negligible

Operation

Building Services noise

- 9.108 Overall building services noise limits have been established to achieve compliance with published guidelines. To ensure compliance with the criteria, individual items of building services plant and any associated noise control hardware will need to be selected such that the cumulative noise levels from all plant items do not exceed the overall building services noise limits.
- 9.109 Given compliance with the building services noise limits given in Tables 9.16 and 9.17, the noise impact of mechanical plant serving the Proposed Development is expected to be **negligible** and therefore no mitigation is required.

Noise from Amenity Areas and Commercial Units

- 9.110 Environmental noise limits relating to activity noise egress from the proposed amenity spaces and commercial units have been established to ensure compliance with published guidelines.
- 9.111 Given compliance with the external music noise limits given in Table 9.18, the noise impact of the amenity spaces and commercial units within the Proposed Development is expected to be **negligible** and therefore no mitigation is required.

Cumulative Effects

Construction

- 9.112 There is expected to be an overlap of construction works at the Site and at other committed developments in the vicinity of the Site. However, the other development sites are at a much greater distance from the closest buildings to the Site and are expected to be at a different stage in their build programmes such that the noisier construction activities including demolition and excavation may have ceased at the time that these activities commence at the Site. In addition, these other development sites will be controlled by approved Construction Environmental Management Plans, which will limit noise through implementation of mitigation. It is therefore expected that the cumulative construction noise levels at the nearby noise-sensitive buildings will be principally determined by the construction activities at the proposed Site. With reference to paragraph 9.100 above, the cumulative effect of construction noise following mitigation is expected to range between **negligible** and **minor adverse**.

Operation

- 9.113 Operational noise due to the Proposed Development and the committed developments in the surrounding area would include mechanical services noise, noise egress due to leisure activities and changes in road traffic noise levels due to changes in traffic flows.
- 9.114 The cumulative impact of noise due to changes in road traffic flows is expected to be **negligible**. This result takes into account the predicted changes in traffic flow relating to the committed developments in the surrounding area. A full Transport Statement is submitted in support of this application.
- 9.115 Operational noise limits due to mechanical services at the Proposed Development have been derived using the methodology and assessment criteria given in BS4142: 2014+A1:2019. Operational noise limits for any mechanical services systems at the buildings of the committed developments in the surrounding area would also be derived using the methodology and assessment criteria given in BS4142: 2014+A1:2019. The Planning Conditions for the committed developments in the surrounding area include a requirement for the building and any externally mounted ancillary equipment to be acoustically insulated in accordance with a scheme submitted to and approved in writing by the City Council in order to secure a reduction in the level of noise emanating from the equipment. The applicable noise limits will tend to be governed by the need to minimise noise levels at the buildings within the Proposed Development, as these are the closest sensitive receptors in the majority of cases. Therefore, given the relative distances of the sensitive receptors applicable to each development, cumulative impact of building services noise will be **negligible**.

Residual Effects

9.116 Table 9.20 summarises the post-mitigation residual effects.

Table 9.20 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
<i>Construction Phase</i>			
Negligible to moderate adverse construction noise	Local residents	Para. 9.99 & 9.99: Solid screening around Site. Communication with City Council and local residents. Application of 'Best Practicable Means' with regard to noise control	Negligible to minor adverse construction noise effects
<i>Operational Phase</i>			
Negligible building services plant noise effects	Residential properties	Para. 9.91: Adherence to environmental noise limits for plant	Negligible building services plant noise effects
Increase in road traffic noise on local roads	Residential properties	-	Negligible
Negligible activity noise effects from amenity space and commercial units	Residential properties	Para. 9.96: Adherence to environmental noise limits for amenity spaces and commercial units	Negligible activity noise effects from amenity spaces and commercial units

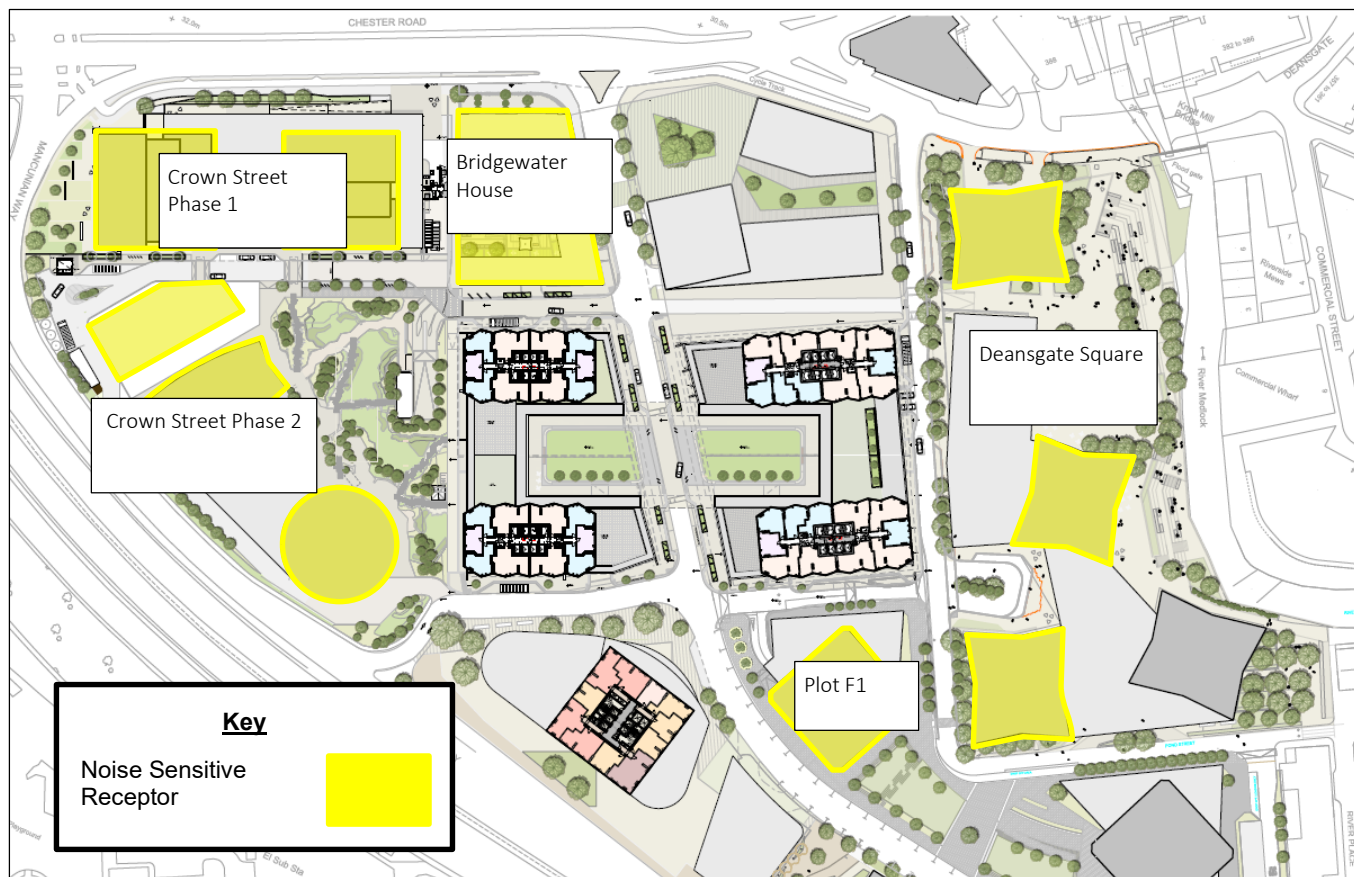


	Figure:	9.1		
	Title:	Noise sensitive premises in proximity to Plots C, D and E		
	Project:	Crown Street Phase 3 and Plot D		
	Date:	22 April 2023	Scale:	NTS

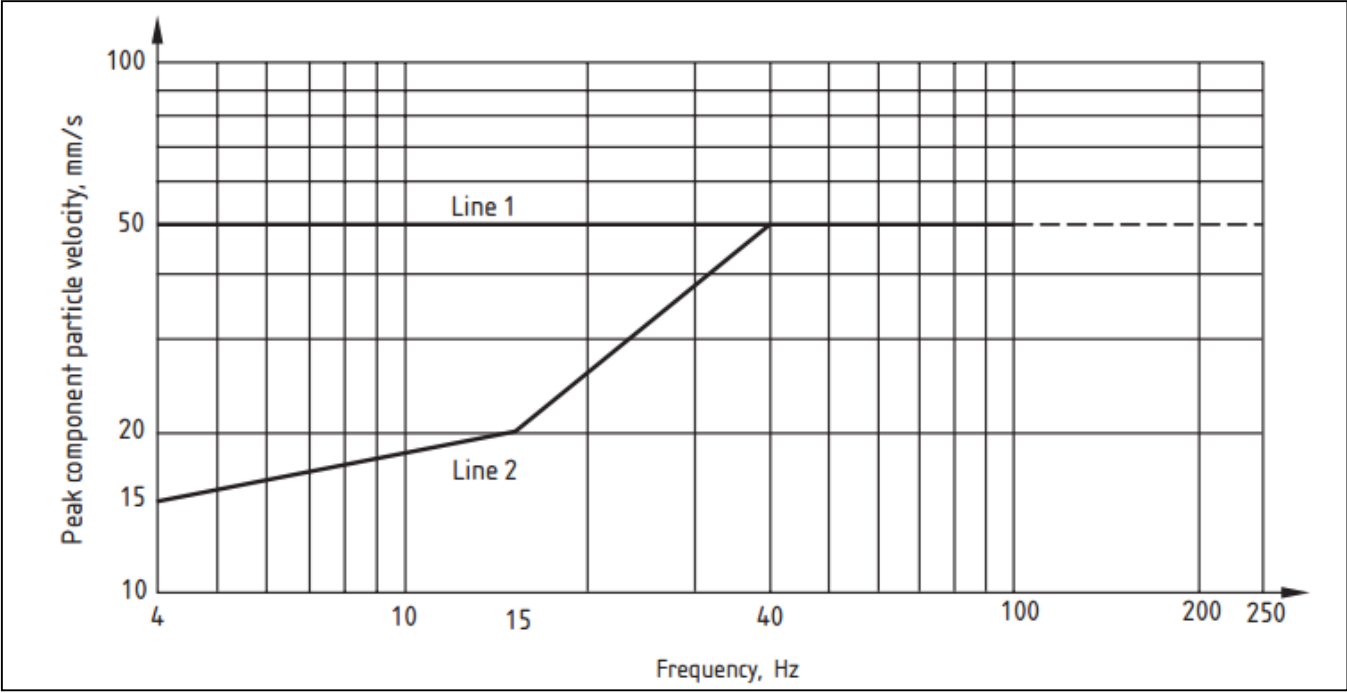


	Figure:	9.2		
	Title:	Transient vibration guide values for cosmetic damage		
	Project:	Crown Street Phase 3 and Plot D		
	Date:	23 March 2023	Scale:	NTS

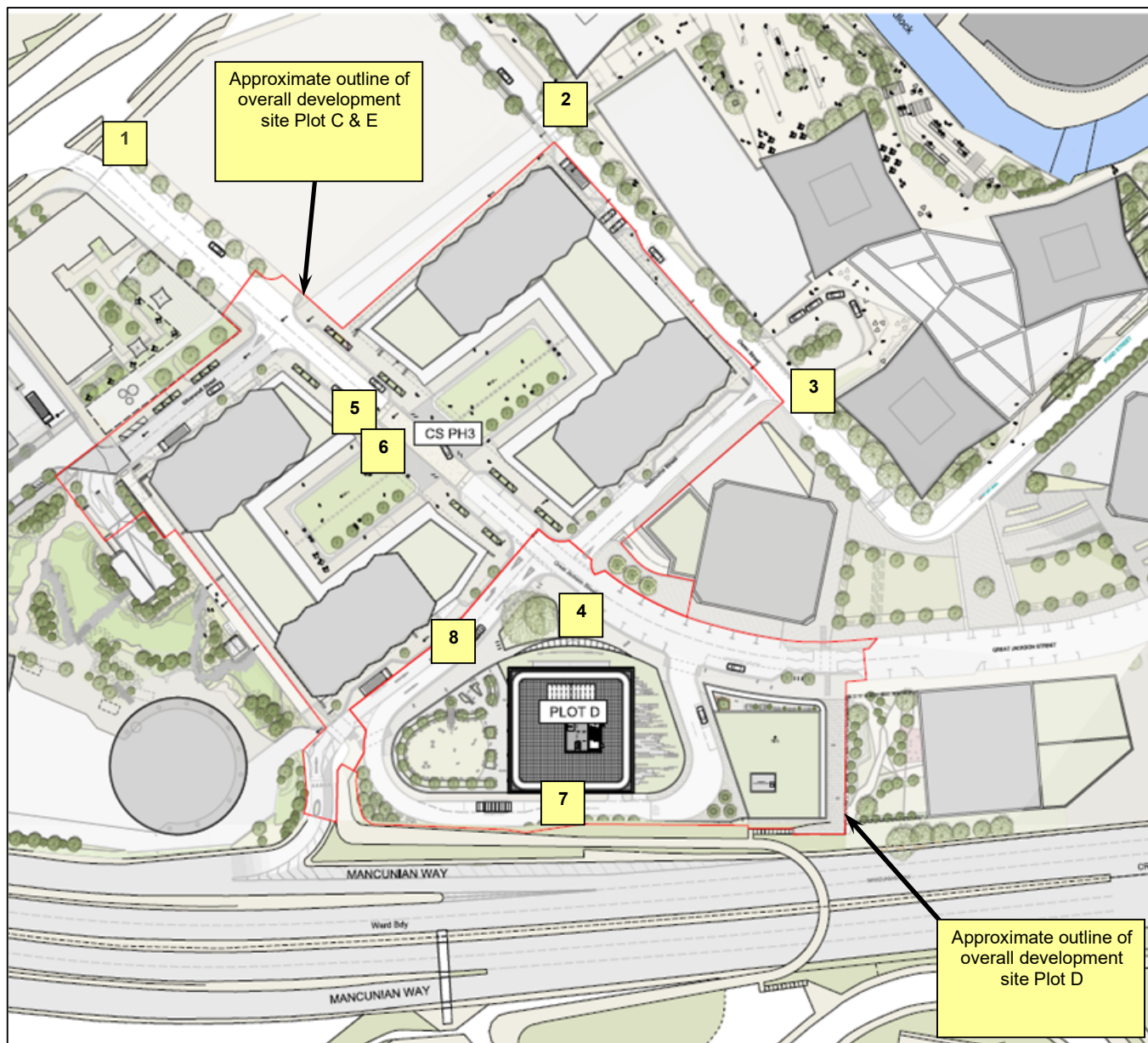


	Figure:	9.3		
	Title:	Noise survey measurement locations		
	Project:	Crown Street Phase 3 and Plot D		
	Date:	22 April 2023	Scale:	NTS

10. Human Health

Introduction

- 10.1. This Chapter of the ES has been prepared by Enfusion and assesses the likely impacts of the Proposed Development upon human health for 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.
- 10.2. The author of the chapter has qualifications BSc MSC CEnv FIEMA with over 25 years experience of assessing plans and projects for their impacts on the environment, including effects on human health and wellbeing. She has prepared health chapters for other Environmental Statements supporting various development project proposals in Manchester and other urban locations. She is a co-author of the practical guide - *The EIA Handbook* (ICE Publishing, Third Edition, November 2019).

Assumptions and Limitations

- 10.3. This Health Chapter considers the findings relevant to human health of each technical impact assessment scoped into the Environmental Statement – Air Quality (Chapter 6); Climate Change (Chapter 7); Daylight, Sunlight & Overshadowing (Chapter 8); Noise & Vibration (Chapter 10); Solar Glare (Chapter 11); Townscape & Visual Impact (Chapter 12); Transport (Chapter 13); Wind Microclimate (Chapter 14); and Socio-Economic (Chapter 15) – and, as such, any key assumptions or limitations associated with each technical impact assessment are addressed within the individual chapters. The overall approach for collating, assessing, and reporting impacts on human health and wellbeing is considered to be appropriate and proportionate such that there are no limitations. The assessment, set out in this ES Chapter, is desk-based and with professional judgment using published information.

Legislative and Policy Context, Guidance

National Planning Policy

National Planning Policy Framework (NPPF 2012, updated 2019, and revised 2021)

- 10.4. The revised NPPF acknowledges the importance of considering health impacts during the planning process and covers many issues that are directly related to the determinants of health. The NPPF identifies the three overarching objectives – economic, social, and environmental – that are *interdependent and need to be pursued in mutually supportive ways* in order to achieve sustainable development (paragraph 8). The social objective should support *“strong, vibrant and healthy communities... by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being.”*
- 10.5. Chapter 8 covers promoting healthy and safe communities, acknowledging that planning policies and decisions should aim to achieve healthy, inclusive, and safe places which:
- “a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages.
- “b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas; and
- “c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling.” (paragraph 92).

- 10.6. Social, recreational, and cultural facilities and services should ‘support the delivery of local strategies to improve health, social and cultural wellbeing for all sections of the community (paragraph 93). It is important that sufficient choice of school places is available to meet the needs of existing and new communities (paragraph 95). Public safety should be promoted and “take into account wider security and defence requirements” (paragraph 97).
- 10.7. “Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and wellbeing of communities” (paragraph 98). Sustainable transport should be promoted and this “can help improve air quality and public health” (paragraph 105). “An effective use of land should be promoted in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions” (paragraph 119). “Developments should create places that are safe, inclusive, and accessible and which promote health and wellbeing...” (paragraph 130). “New development must be appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health...” (paragraph 185).

Public Health England (PHE) Strategy (2019)

- 10.8. Sets out how PHE intends to protect and improve the public’s health and reduce inequalities during 2020 to 2025. The Strategy recognises that the longer term, societal drivers of change represent the principal challenge facing the public’s health. However, there are opportunities now, including “*place-based approaches*”. The ten priorities include *healthier diets, healthier weight; cleaner air; and better mental health*” with the aim to incorporate the reduction of health inequalities into each of the ten priorities. The purpose of PHE is to protect and improve the nation’s health and reduce health inequalities. This is guided by aims – “*to keep people safe; to prevent poor health; to narrow the health gap; and the support a strong economy*”.

Sub-Regional Planning Policy

Places for Everyone – Joint Development Plan (Greater Manchester Councils Publication Draft 2021)

- 10.9. The Vision within the Draft Development Plan (JDP) for Greater Manchester (GM) includes to make Greater Manchester as “a place where people live healthy lives”; and Strategic Objectives include No 10 “to promote the health and wellbeing of communities”. The overall draft Strategy and many of the policies in the plan support improvements in health and wellbeing, and reductions in health inequalities, such as by “promoting a successful economy; increasing supply of high quality and affordable homes; enabling people to adopt healthier lifestyles; and reducing risks to human health”. The JDP recognises that addressing health inequalities will require a diverse range of coordinated measures. The JDP supports improvements in health and wellbeing including through promoting a successful economy, enabling people to adopt healthier lifestyles, and reducing the risks to human health

Local Planning Policy

Manchester City Council (MCC) Core Strategy (adopted 2012)

- 10.10. MCC’s Core Strategy is the key document in Manchester’s Local Development Plan. It is founded on a Vision to 2027 that includes “*an increased and sustainable healthy population...*”. Policies relevant to health are as follows:
- Policy SP1 Spatial Principles includes requirement that development should make a positive contribution to neighbourhoods including “*making a positive contribution to the health, safety and wellbeing of residents*’
 - Policy EC1 Employment and Economic Growth in Manchester requires development proposals to make the best possible use of a site in terms of efficient use of space and including application of best practice in security design.
 - Policy EN4 seeks to reduce CO₂ emission and reduce fuel poverty by enabling low and zero carbon development.
 - Policy EN8 Adaptation to Climate Change includes requirements to minimise flood risk and reduce urban overheating.
 - Policy EN9 Green Infrastructure provides guidance on provision of new, and improvements to, the quality and accessibility of existing green infrastructure assets.
 - Policies EN10 and EN11 safeguard and create new open space, sport and recreation facilities.
 - Health is further protected through Policies EN14 Flood Risk, EN16 Air Quality, EN17 Water Quality, and EN18 Contaminated Land & Ground Stability
 - Policy T1 Sustainable Transport requires “*delivery of a sustainable, high quality, integrated transport system to encourage modal shift away from car travel... and to prepare for carbon free modes of transport*”.

- Policy T2 will actively manage the pattern of development to ensure that there are accessible areas of opportunity and need.
- Policy T3 supports proposals that contribute to an economically and environmentally sustainable transport network through strategic integration of strategic transport projects. Progression towards sustainable transport will promote healthier living and well-being.
- Policy *DM1 Development Management requires that all development should have regard to specific issues including “Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation”; Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes”; “Community safety & crime prevention”; and “Design for Health.*

Great Jackson Street Development Framework (Manchester City Council 2007, updated 2015 & 2018)

- 10.11. The 2018 update amended the masterplan design in order to enhance the neighbourhood quality and maximise regeneration outcomes. The Development Framework vision remains consistent – and is to “create a vibrant, safe, secure and sustainable community”.

Our Manchester Strategy, Forward to 2025

- 10.12. The Strategy sets out the future envisaged for the city and the priorities were reset following wide consultation during 2020. Communities want to see a renewed focus on six themes, including Health – tackling physical and mental inequalities and ensuring fair access to integrated services.

Other Relevant Policy, Strategy & Guidance

Public Health England (PHE) Spatial Planning for Health (2017)

- 10.13. Provides evidence of links between spatial planning and health, focusing on five key built environment topics – neighbourhood design, housing, healthier food, natural and sustainable environment, and transport.

Public Health England (PHE) Health Impact Assessment in Spatial Planning (2020)

- 10.14. Provides a guide for local authority public health and planning teams setting out process and practice with regard to the wider determinants of health and wellbeing for plan-making and the planning application process. It identifies eight categories of health and wellbeing outcomes in planning: reduce health inequalities; improve mental health & wellbeing; improve diet & weight; improve musculoskeletal health; improve respiratory health; improve cardiovascular health; protect environmental health; and provide access to health & care infrastructure and services. The guide is mostly associated with the plan-making and associated strategic environmental assessment processes. However, it does include an annex on integrating HIA in EIA and it does confirm the importance of a “*proportionate and justified approach*”.

Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in EIA; Determining Significance for Human Health in EIA (November 2022)

- 10.15. Provides a framework that supports a proportionate approach that can apply to all scales and sectors of EIA. It confirms that a wider determinants approach should be taken by EIA scoping. An EIA health chapter is required when other EIA technical topics have been scoped in to assess likely significant effects on human receptors, or there is a likely significant change for the health of a group of individuals due to the proposed project and in a wider determinant of health not covered by other technical EIA topics.

Manchester Housing Strategy (2022-2032)

- 10.16. Recognises that the COVID-19 pandemic and cost-of-living crisis have exacerbated longstanding health and housing inequalities in Manchester and disproportionately affected at-risk residents. It is understood that significant progress must be made towards a net zero-carbon housing offer in Manchester and the need for healthier, warmer and more efficient homes is highlighted.

Assessment Methodology and Significance Criteria

- 10.17. Health Impact Assessment (HIA) and health in EIA are separate processes, and there is no standard methodology for assessing health in EIA. The coverage of health in EIA need not be so comprehensive as the HIA that is used to inform detailed project design, but guidance documents for good practice in HIA can inform EIA practice in relation to human health and well-being. It is important that health in EIA is proportionate, balanced, and relevant. The approach here is proportionate - based on consultation responses in line with the screening report, professional experience, and assessment of impacts against relevant baseline information
- 10.18. *Shaping Neighbourhoods: For Local Health and Global Sustainability* (2003, 2010 & 2021) sets out the complexities of planning for health due to the multiple determinants and the need for cross-sectoral understanding and collaboration. This guide established a health map demonstrating the linkages between the global ecosystem, the natural and built environments, the local economy with communities, people, and their lifestyles. It explains the likely interactions between different sectors and seeks a common language for spatial planning and public health practitioners.
- 10.19. The complexities of investigating health impacts are recognised by Public Health England (PHE) and the Wider Determinants of Health tool is an ongoing project that provides resources for categories of factors that affect health, as follows: built & natural environment; work & the labour market; vulnerability; income; crime; education.
- 10.20. The London Healthy Urban Development Unit (HUDU) 'Healthy Urban Planning Checklist' (2017) provides a useful checklist that was developed for London but is applicable to development proposals in urban city centres elsewhere in the UK. The checklist aims to promote healthy urban planning by ensuring that the health and wellbeing implications of local plans and major planning applications are consistently taken into account, through providing a set of themes and planning issues that can be used to assess development proposals. It can be used to help screen possible health impacts for a health impact assessment. Changes in certain determinants caused by development projects may affect the health and wellbeing of existing and new residents. The checklist is divided into four themes – healthy housing; active travel; healthy environment; and vibrant neighbourhoods.
- 10.21. This HUDU checklist recognises that health and wellbeing can be affected by multiple determinants as shown in Figure 10.1.

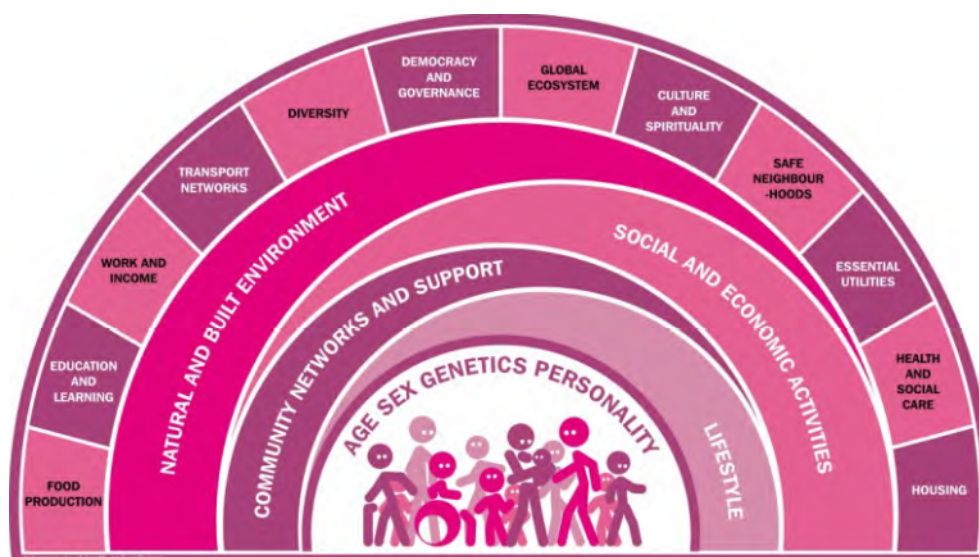


Figure 10.1: The Determinants of Health and Wellbeing (London HUDU developed from Barton & Grant 2007)

- 10.22. The HUDU has further developed the checklist into a rapid HIA tool (London HUDU, 2019) that uses existing evidence to quickly assess the impacts of a development plan or proposal and recommend measures to address any negative impacts and maximise benefits. The tool is based on eleven topics or broad determinants of health and wellbeing focused on the built environment and issues influenced by planning decisions.
- 10.23. For the purposes of this health impact assessment, we have applied the HUDU checklist and eleven topics to the Proposed Development in order to help determine the scope of the assessment by identifying the relevant topics. Applicable criteria/questions for each of the scoped topics were considered at the assessment stage in order to assess potential health impacts and the need for any mitigation or enhancement. Existing information and evidence were used, and impact assessment undertaken using professional judgment.
- 10.24. **Housing design and affordability** are key factors – provision of good quality residential development is known to have positive effects on health and wellbeing.
- 10.25. **Access to health and social care services** and other social infrastructure is directly important for health. This health assessment considers the proximity, accessibility, and capacity (where possible) of health and medical centres and dentists in the vicinity of the proposed development. It considers the proximity and accessibility of gyms, leisure centres, sports/recreational and cultural facilities nearby since such activities are important contributors to health and wellbeing. Searches were made through web-based sources and using Google Maps to measure approximate distances by walking and/or public transport from the centre of the proposed development area to the facility.
- 10.26. **Access to open space and nature** is a key factor. The proximity of open spaces and walking/cycling routes is investigated since access to open space and healthy modes of transport also contributes to healthier lifestyles and wellbeing.
- 10.27. **Air quality, noise and neighbourhood amenity** are important factors for health and wellbeing. Summary findings from the technical studies for air quality and noise in the EIA are considered and their implications for health and wellbeing incorporated into this HIA.
- 10.28. **Accessibility and active travel** are well established as factors in health and wellbeing. Summary findings from the technical studies for transport and informing the air quality studies are considered and their implications for health and wellbeing incorporated into this health impact assessment.
- 10.29. **Crime reduction and community safety** is a key factor in health and wellbeing of communities and this health impact assessment considers those elements of the development proposals that contribute to safety.
- 10.30. **Access to healthy food** is a direct factor in health and consideration is given to accessibility to a range of food stores with a mix of affordable shops. Provision of allotments or community gardens for growing food is beyond the scope of the development proposal.
- 10.31. **Access to work and training** is known to affect health and wellbeing. The delivery of a separate sustainable office building, as well as ground floor flexible commercial use for two of the residential buildings will contribute to the wellbeing associated with access to employment.
- 10.32. **Social cohesion and inclusive design** are key factors for health and wellbeing. This HIA considers the implications of the design and project proposals in this respect, including connectivity and the potential for non-cohesion with existing communities.
- 10.33. **Minimising use of resources** and **addressing the effects of climate change** are key factors in considering environmental sustainability and a healthy environment – and consequently, health and wellbeing for people and communities. Risks associated with flooding and ground contamination have been determined to be very low and were scoped out of the EIA and therefore are not considered to be significant for health and wellbeing. Risks associated with extreme weather conditions and climate change are considered within this health impact assessment.
- 10.34. Overall, the HIA aims to consider impacts associated with the construction and the occupational phases. It considers embedded mitigation provided through the design of the project – such as layout, and building standards, together with specific mitigation for potential negative effects – such as the commitment to a Construction Environmental Management Plan (CEMP) to control and minimise any effects associated with nuisance noise and dust.
- 10.35. This Health chapter considers the direct implications for health such as the provision of residential accommodation, commercial and employment space. Also, direct effects such as those arising through pollution, air quality, climate change, and safety risks, as well as accessibility to healthcare facilities and sustainable transport (public, cycling and walking) for healthy living. It further considers the wider implications for health and well-being, such as disturbance/nuisance, provision and accessibility to open space, green infrastructure, amenity, cultural, leisure, and recreational facilities.

- 10.36. The summary findings of the Socio-Economic (Chapter 15) and Townscape/Visual Impact (Chapter 12) studies are integrated into the implications for the four themes for healthy urban living since these topics are key contributors to improvements in health and wellbeing.
- 10.37. The key findings from the Air Quality (Chapter 6); Climate Change (Chapter 7); Daylight, Sunlight & Overshadowing (Chapter 8); Noise & Vibration (Chapter 9); Wind Microclimate (Chapter 14); and Traffic & Transport (Chapter 13) assessments are considered in order to integrate within this Health chapter the key impacts associated with any pollution and future climate change effects that can affect human health and wellbeing.
- 10.38. Each technical impact assessment is subject to its own standards, regulations, and methods of assessment. The key findings from each are considered and integrated into the four themes of - Healthy Housing; Active Travel; Healthy Environment; and Vibrant Neighbourhoods. Thus, any significant impacts for human health are clearly presented in a separate chapter.
- 10.39. This chapter on health is not a Health Needs Assessment and does not attempt to quantify health care contributions. It should also be noted that certain health issues are not scoped into the EIA due to their coverage within other permitting or risk management processes. For example, health & safety, emergency planning, and building requirements are addressed by other relevant regulation and this does not require further consideration beyond noting that it helps mitigate community healthcare implications.
- 10.40. The geographical scope is determined by receptor groups that are likely to be significantly affected by the Proposed Development. The scope of the Health Chapter is in part dependent upon the study areas and potential receptors identified in the other technical assessments (including air quality, climate change, sunlight, noise, socio-economic, transport and wind). Thus, the study area comprises the Proposed Development site with local surrounds and the wider study area of Manchester City – as applicable to each of the factors relevant to human health and wellbeing for the proposed project. The scope of the human health impact assessment chapter is as outlined above and is undertaken in consideration of the proposed development as part of a wider strategic development area.
- 10.41. Receptors were identified, as follows:
- construction workers
 - existing residents, businesses, communities around the site, and including any sensitive receptors such as hospitals, nurseries, schools, care homes identified by the technical assessments
 - future users and visitors of the site
 - pedestrians in the vicinity of the site
- 10.42. The Institute of Environmental Management & Assessment (IEMA) paper on Health in EIA (2017) explains the complexities associated with defining significance for population and human health. This guidance notes that there is an absence of specific significance criteria or defined thresholds for determining significance for population and health in UK EIA practice. Given the multitude of factors that contribute to an individual's health outcomes, it is difficult to draw a quantified conclusion regarding the contribution of a particular development to an increase or decrease in the number of additional cases of a particular physical or mental health outcome.
- 10.43. The recent IEMA guidance (November 2022) suggests categories and wider determinants of health, and those relevant to the Proposed Development were identified, as follows:

Table 9. 1 EIA Wider Determinants of Health

Category	Wider Determinants of Health
Health related behaviours	Physical activity; diet & nutrition
Social environment	Housing; relocation; open space, leisure & play; transport modes & access; community safety; community identity & resilience; social participation, interaction & support
Economic environment	Education & training; employment & income
Bio-physical environment	Climate change mitigation & adaptation; air quality ; land quality ; noise & vibration; radiation
Institutional & built environment	Health & social care facilities; built environment; wider societal infrastructure & resources

- 10.44. The guide also sets out a generic human health magnitude criteria and significance criteria, as follows:

Table 9. 2 Human Health Magnitude Criteria

Category	Indicative Criteria (narrative based on professional judgment for magnitude change of population or sub-population)
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High	high exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications
Medium	low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications
Low	very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
Negligible	negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication

Table 9.3 Human Health Significance Matrix

Magnitude	Sensitivity				
		High	Medium	Low	Very Low
	High	Major	Major/Moderate	Moderate/Minor	Minor/Negligible
	Medium	Major/Moderate	Moderate	Minor	Minor/Negligible
	Low	Moderate/Minor	Minor	Minor	Negligible
	Negligible	Minor /Negligible	Minor/Negligible	Negligible	Negligible

- 10.45. Therefore, a significant effect is reported in this assessment where, based on professional judgment, the Proposed Development is likely to contribute to a material change in health outcomes associated with the health issue being assessed and, in determining this, the following questions have been considered:
- Have significant effects been identified in other assessments undertaken as part of the EIA that are linked to human health (i.e. are environmental or health standards threatened)?
 - Are vulnerable groups affected?
 - Is the effect reversible or irreversible?
 - Does the effect occur over the short (less than one year), medium (one to five years) or long (over five years) term?
 - Is the effect permanent or temporary?
 - Does it increase or decrease with time?
 - Is the effect at an individual, community or population level?
 - Are mitigating measures available and is it reasonable to require these?
- 10.46. Effects that are described as ‘minor’ or ‘negligible’ are determined to be ‘Not Significant’ and effects that are described as ‘moderate’ or ‘major’ are determined to be ‘Significant’. This takes into account the sensitivities of receptors (high, moderate, low) and as set out previously in Table 2.4 in the EIA Methodology (Chapter 2). The criteria and categories of significance applied in this human health impact assessment are, as follows:
- Major Adverse/Beneficial – important considerations at local or district scale; if adverse, are potential concerns to the project and may become key factors in the decision-making process; changes due to the project have a substantial effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being crossed
 - Moderate Adverse/Beneficial – modest important local effects that, if adverse, may be key issues for decision-making; changes due to the project have an influential effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being approached
 - Minor Adverse/Beneficial – Slight, short, or highly localised effects that, if adverse, are unlikely to be important in the decision-making process; changes due to the project have a marginal effect on ability to deliver current health policy and/or ability to narrow health inequalities
 - Negligible – no appreciable effects on health factors

- 10.47. Standardised sectoral thresholds and significance criteria have been used for each of the relevant technical factors that contribute to health and well-being, according to recognised guidance, standards, and assessment methods for climate change; noise & vibration; air quality; visual impact; daylight, sunlight, & overshadowing; socioeconomics; wind microclimate; and traffic & transport. Then, the overall likely significant effects on health have been determined in a qualitative way using professional judgment.

Scenarios Tested

- 10.48. The human health impact assessment considers the worst case scenario of the completed project Crown Street Phase 3 & Plot D and tests scenario 7. It also considers the likely cumulative effects with relevant committed developments and tests scenario 13. The relevant scenarios are as follows:
- Scenario 1: Baseline
 - Scenario 7: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6
 - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative
- 10.49. The assessments are based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to human health and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that human health will be testing the development as a whole.

The Study Area

- 10.50. Each technical topic relevant to health and wellbeing defines its own study area according to appropriate regulations, standards and guidance. Overall, the health impact assessment considers the site and surrounding area.

Baseline Conditions

- 10.51. The baseline informing the assessment draws upon local health and wellbeing information and priorities, such as those set out in the Manchester City Joint Strategic Needs Assessment (JSNA 2022), published local authority health profiles through Public Health England (PHE, 2018-2021), and as reported by Manchester City Council, for example, through the MCC Intelligence Hub. The key baseline from the other technical topics is considered, including risks to health/wellbeing such as from air quality, noise, and risks associated with the effects of climate change. The key baseline information from the townscape and socio-economic studies has been considered. It has not been necessary for this assessment to undertake primary research or surveys and this desk-based approach using published information and professional judgment provides an appropriate level of detail.
- 10.52. **Population:** According to PHE data (2018-2020), life expectancy at birth for Manchester is 75.5 (males) and 79.9 (females) compared with 79.4 (males) and 83.1 (females) averaged for England. Provisional estimates of life expectancy at birth show the impact of the Covid-19 pandemic. The size of the fall in life expectancy in Manchester is more than that seen in England overall, widening inequalities in life expectancies between Manchester and the national average. Physically active adults (2019-20) are recorded at 62.4% for Manchester, lower than that averaged for England at 66.4%. Percentage of adults classified as overweight or obese are recorded at 61.0%, slightly lower than the 62.8% averaged for England. The excess winter deaths index (2019-20) at 18.3% was slightly higher than the averaged value of 17.4% for England.
- 10.53. The Proposed Development is located in Deansgate Ward. According to MCC Intelligence Hub information using Ward profiles, the Deansgate Ward has very good health (2011 self-assessment from residents of the state of their general health), within the medium range for the City. Emergency hospital admissions for all causes are low at 36.3, compared with other Wards in Manchester, and at the lowest of the range 36.3-186.7 for all Wards – indicating less poor health. The Index of Multiple deprivation (IMD) is an overall relative measure of deprivation constructed by combining seven domains of deprivation – Income; Employment; Education; Skills & Training; Health & Disability; Crime; Barriers to Housing Services and Living Environment. The Deansgate Ward has a IMD score (2019) of 24.14, (the least deprived is in the range 15.5-31.1 with 48.4-62.7 indicating the most deprived) indicating that Deansgate is one of the least deprived Wards in the City.
- 10.54. The Deansgate Ward also shows good health when other indicators are considered. The number of estimated households in fuel poverty (2020) was 604 which is within the lowest range for the City. The number of residents claiming benefits (Feb 2022) is the lowest in the City at 1,009 for a range of 1,009-8,254 for all Wards. Incidence of all cancer (2014-18) is 72.5 and at the lower end of the range 70.8-142.1 for MCC. The total reported street crimes for 2018 was 14,172, similar to adjacent Wards, and at the higher end of the range from 1,343 – 16,552 for all Wards.

- 10.55. **Employment:** Manchester has a lower proportion of employment in the construction sector (2.6%) than Greater Manchester (5.4%), the North West (5.5%) and nationally (4.9%). The sector is therefore underrepresented locally. Manchester has a higher share of employment within sectors that broadly reflect the office-based service economy. These sectors account for 37% of employment, compared to Greater Manchester (29%), the North West (25%) and nationally (28%). Manchester has a lower proportion of employment (22%) in retail, leisure and hospitality sectors (defined as Retail, Accommodation & food services and Arts, entertainment, recreation & other services) compared to the national and regional averages (26%). (BRES, 2021). Productivity in retail, leisure and hospitality sectors is higher in Manchester (c.£44,000) than comparator areas.
- 10.56. **Healthcare Facilities:** There are eight GP practices/Health Centres operating at various patient to FTE GP ratios and within the neighbourhood/local level of within 1 mile of the Site. There are nine dental practices within around 1 mile radius of the Site. GM Healthwatch (2021) highlighted the current capacity of NHS dentists as insufficient to meet demand. There are no care homes within the vicinity. The nearest hospitals are within approximately 1 mile to the north and approximately 2 miles to the south-east distance from the Site. A new build medical centre is to be provided at the ground and first floor of the Elizabeth Tower residential development within the Great Jackson Street Strategic Regeneration Framework area. It is understood that this facility is likely to be operational within 2023. It is understood the new centre will include 16 clinical rooms and could support a patient population in the order of 20,000.
- 10.57. **Educational Facilities:** There are 3 nurseries/pre-school, 6 primary schools, and one secondary school within 1 mile of the Site. Manchester Metropolitan University is less than 1 mile to the east and the University of Manchester some 1.4 miles to the south-east of the Site. The school and nursery as part of Crown Street Phase 2 will open for September 2024 intake.
- 10.58. **Crime:** The total reported street crimes for 2018 in Deansgate Ward was 14,172, similar to adjacent Wards, and at the higher end of the range from 1,343 – 16,552 reported within Manchester. Between December 2021 and November 2022 there were 19 reported crimes in total in the study area. The most common type of reported crimes in the study area were violence and sexual offences (42.1%), public order (31.6%) and theft from the person (10.5%). There were no crimes reported in the immediate vicinity of the application site, with the vast majority of crimes occurring closer to Deansgate Railway Station.
- 10.59. **Open Space, Recreation & Amenity:** There are a number of open/amenity spaces in proximity to the Site including Hulme Park, All Saints Park, Castlefield Urban Heritage Park, St John's Gardens, and Sackville Garden. A park will be opened as part of Crown Street Phase 2. Being a city centre site there are numerous leisure sites within close proximity to the Site, including cinemas, cafes, bars/pubs, restaurants, theatres, cinemas and galleries. There are various gyms and leisure/sports centres in the vicinity – gyms and swimming pool within 1-1.5 miles of the Site.
- 10.60. **Townscape & Visual Impact:** The Site is currently underutilised it is part cleared, and includes a temporary marketing suite, temporary site cabins associated with development elsewhere and a temporary concrete batching plant. It is located within the densely urban environment of a city centre character. The studies identified 19 representative viewpoints from a number of townscape zones that could be significantly affected – Civic Quarter, The Village, Spinningfields, Petersfield, Castlefield, Water Street, First Street, Great Jackson Street, Hulme, and Corridor Manchester.
- 10.61. **Air Quality:** As with the majority of Manchester City Centre, the Site is located within the Greater Manchester Air Quality Management Area (AQMA). Local air quality at the proposed development site is and will be affected by local traffic flows; the Site is close to major roads that generate significant road traffic emissions, including the A56 and A57(M). The technical studies identified 41 sensitive receptors near to the Site, mostly residential but also including 3 commercial and 2 educational receptors. The main sources of pollutant emissions within the vicinity of the Site are road vehicle exhaust emissions associated with the A57 (Mancunian Way) and A56 (Chester Road).
- 10.62. **Noise & Vibration:** 14 receptors potentially sensitive to noise were identified around the Site and comprised residential and commercial space. Surveys were undertaken to establish the baseline noise environment at the existing local sensitive buildings and for assessing the noise levels able to impact upon the façades of the Proposed Development. The long-term noise environment at and around the Site is principally determined by road traffic on Mancunian Way (A57(M)) and Chester Road, with a contribution to noise levels from road traffic on Great Jackson Street. There are no major sources of vibration in proximity to the Site.
- 10.63. **Wind Microclimate:** The baseline considered the surrounding context with regard to safety and amenity. 55 existing potential sensitive receptor locations were investigated, together with 13 locations for the Proposed Development. For the baseline scenario, wind conditions across most of the receptors are suitable, in terms of comfort, for their intended pedestrian uses and there are no exceedances of the pedestrian safety criteria. Wind conditions across most of the receptors are suitable, in terms of comfort, for their intended pedestrian uses.

- 10.64. **Daylight, Sunlight & Overshadowing:** Current daylight conditions are atypical as the Site is underutilised with only a small number of very low structures. Existing residents nearby will have an expectation of high-density development coming forward and affecting daylight conditions – all as the redevelopment of the area progresses.
- 10.65. **Climate Change:** Greenhouse gas (GHG) emissions occur constantly and widely as a result of human and natural activity, including energy consumption (fuel, power), industrial processes, land use and land use change. The current use of the Site comprises light industrial units, office use, as well as residential and retail uses.
- 10.66. **Traffic & Transport:** The Site is located in a key strategic location to the south of the city centre, being within a ten-minute walk of the transport hubs of Deansgate train station and Deansgate-Castlefield Metrolink station. The Site is within walking distance of two key transportation hubs at Manchester Oxford Road Station and Piccadilly Station both of which offer local, regional, and national main line rail connections. Both stations also provide direct access to Manchester Airport. The closest Metrolink stop to the Site is about 600m away at Deansgate-Castlefield, but the regional Metrolink network can also be accessed from Manchester Piccadilly or St Peter's Square Metrolink stops. There are also several bus stops along the A56 Chester Road and A5103 Medlock Street with a large number of services available. The Site is within easy walking distance to employment opportunities and the services and facilities offered by Manchester City Centre and in close proximity to the district of Hulme, just beyond the Mancunian Way to the south. The Site is strategically situated within Manchester City Centre such that the surrounding facilities can benefit future residents of all ages. The Site is therefore considered to be highly accessible by foot with various employment, education, health, retail and leisure facilities within walking distance of the Site.
- 10.67. The Site is also conveniently located to various public transport routes and interchanges. Some of the most attractive cycle routes in the area lie alongside the waterway network. There are cycle routes alongside both the Bridgewater Canal and the River Irwell that are easily accessible from the Site. National Cycle Route 6 is located some 650m to the north of the Site on Liverpool Road. The local cycle network is also a part of Greater Manchester's cycling and walking infrastructure proposal, named the "Bee Network". Therefore, Site is considered to be highly accessible by bicycle and would provide a realistic alternative to travel by car.
- 10.68. Traffic surveys were undertaken at key junctions on the local highway network to inform consideration of background traffic growth. The existing Site is currently occupied by existing commercial and industrial uses. There is also a high level of general construction activity in the local area related to adjacent development Sites.

Identification and Evaluation of Likely Significant Effects and Mitigation Measures

- 10.69. The Proposed Development include the demolition of all buildings on the site including the removal of the concrete batching plant. Phase 3 Crown Street includes for the erection of four residential buildings, two at 47 storeys and two at 51 including ground floor flexible commercial use. Plot D includes a 71 storey residential building and a separate 3 storey office building.
- 10.70. **Housing:** Crown Street Phase 3 will deliver 1,746 apartments in four residential buildings with 422 apartments in each of C7 & C8 at approximately 151m height, and with 451 apartments in each of E1 & E2 at approximately 140m height. Plot D will deliver a total of 642 apartments in one building at approximately 213m height. The delivery of good quality and energy efficient apartments in a sustainable location in the city centre will contribute to the identified need for such housing and with Moderate Beneficial effects.
- 10.71. **Employment:** The estimated construction spend associated with the Proposed Development will support a temporary economic uplift during the construction period. The number of construction workers is likely to fluctuate over the duration of the construction programme to reflect the stage of development reached and associated workforce requirements. The estimated total direct, indirect and induced employment could be in the order of 460 FTEs and the effects are considered to be Moderate Beneficial and temporary. Upon completion, the occupied development in Scenario 7 could provide floorspace to accommodate approximately 295 gross direct FTE jobs. Multiplier effects as a result of spill-over spending through the supply chain suggests that the estimated total direct, indirect and induced employment could be in the order of 201 FTEs. Overall, effects were found to be Negligible. Additional expenditure from residents living within the Proposed Development will contribute towards an uplift in local expenditure in retail, leisure and hospitality sectors. This employment would support a modest uplift in GVA, and indicated to have Negligible effects.

- 10.72. **Healthcare Facilities:** The increase in population could lead to added pressure on existing primary healthcare facilities. Primary healthcare facilities for the general resident population are currently subject to higher demand pressures than the target ratio of 1,800 patients to FTE GP (currently 1,956 patients per FTE GP). As such, the addition of 2,401 residential units to the local area would lead to increased pressures, with an adjusted ratio of 2,063 patients per FTE GP when taking into consideration the average household size in Manchester (ONS, 2019). An additional 8 FTE GPs could be needed, and the new medical centre to be provided in the Elizabeth Tower residential development nearby is likely to contribute to the alleviation of existing pressures on GPs. Overall, it was determined that effects were likely to be **Minor Adverse** which is **Not Significant** in EIA terms.
- 10.73. **Educational Facilities:** The uplift in population is likely to have effects on local educational facilities. There are several pre-schools and primary schools and one secondary school within 1 mile of the Site. It is not known whether all these schools are taking new pupils, nor how many and when. In addition, a new primary school and nursery is set to open in September 2024 as part of Crown Street Phase 2. It is assumed that there will be capacity to accommodate the anticipated uplift over time and therefore, effects are indicated for **Minor Adverse** in the shorter-term which is **Not Significant** in EIA terms.
- 10.74. **Crime:** The provision of lived-in apartments and a change from previous vacant and light industrial uses could indicate that there is less risk from crime or fear of crime. The increased residential population could present greater opportunities for crime; however the inclusion of high quality public realm and open space, together with Secured by Design standards, would help to mitigate this risk. Overall, **Minor Beneficial** effects that are **Not Significant** in EIA terms.
- 10.75. **Open Space, Recreation & Amenity:** An uplift in resident population as a result of Scenario 7 will increase demand and usage of nearby open space and recreation facilities. However, this needs to be balanced against the potential for new quality provision and improved access to existing provision, including the open space being delivered as part of Crown Street Phase 3, alongside the wide array of leisure and amenity facilities located within the assessment area, such that the impacts are considered to be **Negligible**.
- 10.76. **Townscape & Visual Impact:** During the construction phase, sources of townscape and visual effects include site set up and compound, boundary fencing, site clearance, groundworks, access, and contractor parking, plant and equipment. Measures to control construction impacts will be incorporated into a Construction Environmental Management Plan (CEMP) and are likely to include positioning of compounds and stockpiles to limit impacts, high quality site hoarding, and good site management, maintenance and housekeeping. The residual effects on the 19 viewpoints are anticipated to be **Not Significant**.
- 10.77. At the occupational phase, potential townscape and visual effects include changes to characters (townscape and Site), building heights, movement and linkages, public realm, and character and amenity of views. Primary mitigation measures have been embedded into the location and design of the Proposed Development through an iterative process involving environmental assessment and consultation. Overall, the effects will be **Beneficial** – primarily due to the surrounding character of the townscape. The five component parts of the Proposed Development merge into the Great Jackson Street Framework in a consistent way with subtle differentiation between the towers that improves the visual diversity, composition, and townscape character.
- 10.78. **Air Quality:** During the construction phase, there is the potential for dust soiling and risk to human health and wellbeing from dust associated with earthworks, construction material and track out during movement of construction vehicles. Detailed mitigation measures will be set out in the Construction Environmental Management Plan (CEMP) to control and reduce vehicle emissions and dust through various procedures and practices. This will reduce the likely effects to **Not Significant**.
- 10.79. The air quality technical studies used detailed dispersion modelling of NO_x, PM₁₀ and PM_{2.5} emissions from operational traffic to undertake assessment of human exposure at the development at various sensitive receptor locations and including various facades of the proposed buildings. Impacts on NO₂ and PM concentrations associated with road traffic emissions generated by the operational phase were considered **Not Significant** at all sensitive receptor locations. Assuming that offsetting measures, including electric vehicle charging points and cycle parking, are successfully implemented and promote the uptake of low emission vehicles and sustainable transport methods the residual effects of road vehicle exhaust emissions generated during the operational phase are predicted to be **Not Significant**. The modelling also confirms that future occupants will not be exposed to unacceptable air quality and the Site is deemed suitable for its proposed future use.

- 10.80. **Noise & Vibration:** During the construction phase, there will be noise impacts associated with fixed and mobile plant; also, vibration impacts, for example, associated with piling. The construction of a solid, close-boarded hoarding (2.4 metres high) around the majority of the Site is expected to be provided and will reduce the noise impacts. Further mitigation measures, such as transport movements and handling of construction materials, timing of piling, will be detailed in the CEMP, and it was determined that residual impacts will be **Negligible** for all noise sensitive receptor locations. During the occupational phase, there will be noise from the building services plant and road traffic; also, there is the potential for noise egress from the proposed amenity spaces and commercial units within the Proposed Development. Overall building services noise limits have been established to achieve compliance with published guidelines, and therefore, impacts will be **Negligible**. Environmental noise limits relating to activity noise egress from the proposed amenity spaces and commercial units have been established to ensure compliance with published guidelines, and therefore, impacts will be **Negligible**.
- 10.81. **Wind Microclimate:** Wind mitigation measures were developed during the design process and included in the assessment together with the proposed landscaping plan at street level. With conditions meeting the Lawson safety criteria and being suitable for intended uses, this results in residual effects that are **Negligible**. Wind comfort ratings at street level within and in the vicinity of the Proposed Development are suitable for the intended pedestrian uses. Overall, wind impacts are **Negligible** except for some localised areas (Moderate Adverse) that with mitigation will have residual effects that are **Not Significant**.
- 10.82. **Daylight, Sunlight & Overshadowing:** A number of the key Framework plots in the vicinity have either been completed or are under construction to deliver new residential-led schemes. Professional judgment was applied to identify the scope of residential properties for assessment and according to their orientation and proximity to the Site. The assessment was undertaken in the context of the BRE guidance, and also against what is considered acceptable in other residential locations in Manchester city centre. During construction, the effects will gradually accrue until they reach the likely effects on completion. During the operational phase, the studies identified that reductions in daylight and sunlight, and increased overshadowing, will range from Negligible to Moderate Adverse, which, following a qualitative assessment of the impacts is deemed to be **Not Significant** in EIA terms.
- 10.83. **Climate Change:** The technical studies investigated the risk assessment of the impacts on climate change on the proposed development over its projected life cycle (assumed to be 60 years). The sensitive receptor relevant to this assessment is the global climate, as impacted by the generation and release of GHG emissions. The assessment considered embodied carbon and transport carbon emissions during construction and operation. Mitigation measures were developed as integral to the project design to reduce the significance of potential risks of adverse effects, and include encouragement of sustainable modes of transport. During detailed design, consideration will be given to the robustness and durability of materials and assets and their lifetime replacement cycles. Measures including optimising material usage, use of low carbon materials, reducing construction waste, and integrating circular economy principles and using fewer finish materials (for wall, floor, ceiling, façade). For the construction stage, residual impacts were found to be Negligible. For the operational stage, residual impacts for embodied carbon were found to be **Negligible** and for transport carbon emissions to be **Moderate-Minor Adverse**.
- 10.84. **Traffic & Transport:** Studies investigated the likely effects on driver delay, public transport users, pedestrian delay, pedestrian amenity, fear & intimidation, severance, and road safety. For the construction phase, it was identified that the proposed development is likely to have a direct, temporary, short-term (reversible), **Minor Adverse** effect for these factors at a local level for the following, which is **Not Significant**. No specific mitigation measures are therefore required. However, as best practice, a CEMP will be prepared and will seek to minimise the level of disturbance.
- 10.85. The completed and operational phase is likely to have a direct, permanent, long-term, **Negligible to Minor Adverse** effect at a local level, which is **Not Significant** overall. The Proposed Development will deliver benefits to the local area through improved public realm, and pedestrian and cycle facilities, such as new controlled pedestrian/cycle crossings on Great Jackson Street (Pelican) and Melbourne Street (Toucan). It will also be supported by a Framework Travel Plan (FTP), which aims to minimise the number of car trips generated by the development and encourage residents, staff and visitors to use sustainable modes of transport.

Cumulative Effects

Temporary during Construction Phase

- 10.86. Each separate technical topic has considered the relevant effects for health and wellbeing that could be cumulative with other nearby development projects. Each development project is designed and constructed with ways of working that are approved according to regulatory requirements that aim to protect human health and wellbeing. The implementation of such mitigation measures to reduce impacts to acceptable levels is ensured through the Construction Health & Safety Plan (HSP) and Environmental Management Plan (CEMP), and such Plans are applied to the construction of each development project.

- 10.87. During the approximately eight year construction time period, there are the possibilities for cumulative adverse impacts on air quality - dust soiling from activities and emissions from transport; transport disturbance; and loss of amenity for pedestrians and motorists. However, cumulative effects were identified to be Negligible through implementation of the CEMP. The cumulative effect of construction noise following mitigation is expected to range between **Negligible and Minor Adverse – Not Significant**. There will also be opportunity for individuals seeking construction employment and effects on the local economy. Cumulative effects with other identified projects indicate such effects to be likely to **Moderate Beneficial**.

Operational Phase

- 10.88. Cumulative effects relate to Scenario 13. No significant cumulative effects were identified for soci-economic, townscape and visual impacts; daylight sunlight & overshadowing; traffic & transport; air quality, noise, and wind microclimate.

Residual Effects

- 10.89. Post-mitigation residual effects are summarised in the table 9.5, as follows:

Table 9.5 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase. *Significant Receptors listed as identified from each technical chapter and as relevant according to those presented in paragraph 9.42 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases.*

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				
Employment & Economy	Workers; local economy	None required	N/A	Moderate Beneficial
Townscape & Visual	Nearby residents & visitors	Site set-up; boundary fencing & hoardings – all integrated & managed through CEMP	CEMP	Negligible
Air Quality - fugitive dust	Human receptor locations	Specific measures to control dust	CEMP	Negligible
Air Quality – traffic emissions	Existing residential	Sustainable construction travel plan to reduce HGV movements	CEMP	Minor Adverse - Not Significant
Climate Change GHG	Global climate	CEMP & travel plan	CEMP	Negligible
Noise	Workers, existing residents	Hoardings & management of noisy activities	CEMP	Negligible
Wind	Workers, residents	None required	N/A	Negligible
Transport – delay, amenity, fear & intimidation, severance, safety	Drivers, pedestrians, cyclists, public transport users	Framework Travel Plan (FTP)	FTP	Negligible - Not Significant

Table 9.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Employment & Economy	Local workers & economy	None required	N/A	Minor Beneficial - Not Significant
Housing	Local neighbourhoods	None required	N/A	Moderate Beneficial
Healthcare Provision	Residents	None required	N/A	Minor Adverse
Crime	Residents & visitors	None required	N/A	Negligible
Open Space & recreation facilities	Open space and recreational facilities and their users	None required	N/A	Minor Beneficial
Air Quality – road traffic emissions	Human receptor locations	Offsetting measures in the form of sustainable transport principles – 10% EVC charging & cycle parking	Operational Mitigation Strategy	Negligible
Noise	Residents & visitors	None required	N/A	Negligible
Climate Change – embodied Carbon	Global climate – human health	Consideration will be given to further reducing carbon during detailed design		Negligible
Climate Change – Transport GHG	Global climate - human health	Implementation of Travel Plan & increased encouragement of sustainable transport		Moderate-Minor Adverse
Townscape & Visual	Residents & visitors	None required	N/A	Overall Beneficial
Daylight, sunlight & overshadowing	Surrounding residential	None required	N/A	Negligible to Moderate Adverse – Not Significant
Wind	Residential – safety, comfort	None required	N/A	Negligible – Not Significant
Wind	Residential – safety, comfort	Location of seating areas on terrace for small number of locations		Negligible – Not Significant
Transport – delay, amenity, fear & intimidation, severance, safety	Drivers, pedestrians, cyclists, public transport users	Framework Travel Plan (FTP)	FTP	Permanent, long-term Neutral – Minor Adverse effects. Not Significant

Summary for Healthy Urban Living

Social Environment & Health Related Behaviours

- 10.90. The Proposed Development (Scenario 7 provides 1,746 plus 642 residential apartments (total 2,388 units). This high quality accommodation in the city centre is in close proximity to varied employment, services and facilities with strong sustainable transport connections. Overall, moderate beneficial effects indicated for healthy housing objectives as the buildings carefully integrate with others nearby, progressing the vision and intentions for the Greater Jackson Street Framework Development. The buildings have been designed as elements of a wider strategic development framework such that risks of non-cohesion or isolation have been minimised and community cohesion is promoted with overall beneficial effects.
- 10.91. The Site is highly accessible by active and sustainable modes of transport; the surrounding area exhibits excellent levels of pedestrian and cycling infrastructure, and there are a number of public transport opportunities within walking distance of the Site. The Site is well located to take advantage of the excellent existing public transport facilities, and is highly accessible by foot with various employment, education, health, retail and leisure facilities within walking distance of the Site. Overall, the location of the site in an area with excellent accessibility and that will encourage active travel with likely major beneficial effects in the local area that may be synergistic and cumulative in the longer-term. Cycle parking provision 1:1 will be provided in secure internal locations across the basement levels within the Site and this will encourage active travel for more healthy living.
- 10.92. The city centre location is rich in choice and accessibility to shops, bars, restaurants, gyms, museums, and diverse cultural facilities and services such that positive effects for the social environment are indicated. Community identity, social interaction and safety will be encouraged through the proposed development and the active use of the Site. The change delivered through regeneration will contribute to a reduction in crime and an improvement in community safety. Having taken security into consideration in the design process, effects are likely to be positive. The close proximity to and availability of a wide range of food supplies, including affordable healthy food options, can support healthy diet and nutrition for residents.

Economic Environment

- 10.93. The delivery of the good-quality office development on the Site will contribute to the enhancement of the vibrancy of the local neighbourhood within the wider city centre. Provision of and access to employment is known to have a positive effect on health and wellbeing.

Bio-Physical Environment

- 10.94. Any associated risk to human health has been considered through ground condition studies and found to be not significant – the results are below the relevant guideline levels for both residential and commercial uses. The site is located within flood zone 1 with a low probability of flooding and therefore, there is low risk to human health and wellbeing from flooding.
- 10.95. During construction, risks to their health and safety for construction personnel and the public are minimised through the implementation of a Construction Phase Health & Safety Plan that is monitored and periodically reviewed. Site security and safety is secured through perimeter fencing and various activities to ensure that the site is safe from unauthorised access. The potential risks to health for workers and nearby residents from dust and particulates are controlled through the implementation of the CEMP such that residual effects on human health are Negligible. Waste will be segregated, and waste generated during construction will be cleared on a daily basis to a main holding skip, thus minimising risks to health and safety. The contractor will ensure that regular contact is made with local residents, and community groups so that they are kept up to date with the general progress on the site and this will help ameliorate any concerns for wellbeing.
- 10.96. During operation, pollution from vehicle exhausts is the main source of air quality effects in the vicinity of the site. It was determined that the air quality impacts associated with the proposed development are not predicted to be significant. Traffic is also the source of the local noise environment, mostly from the Mancunian Way and Chester Road. Noise studies undertaken to inform the project design considered impacts on existing sensitive receptors and impacts were found to be Negligible. Noise levels will be within the relevant limits for the buildings during operation and the likely impacts associated with any egress of noise from the proposed amenity and commercial spaces was found to be Negligible. There is also potential for adverse effects on the townscape and visual impacts. These will be mitigated through the CEMP, including with the use of quality hoardings. The design of the buildings and their orientation, location within the area, has been developed to minimise adverse impacts on the townscape. The visual impacts overall are Beneficial and consistent within the context of the strategic framework and city centre characters.
- 10.97. Changes to daylight or sunlight, and the wind microclimate can adversely affect health and well-being with regard to a healthy environment. Overall, effects on sunlight and daylight amenity, and overshadowing, were found to be not significant and typical for a city centre development. Potential effects on the wind microclimate were found to be mostly negligible with regard to both safety and comfort for people. During the occupational phase, townscape effects will be improved to be beneficial and visual impacts are minimised – indicating significant enhancement to the townscape and visual experience and further contributing to a healthy environment. The proposed uses will create activity at ground level and create opportunities to animate the streetscene.
- 10.98. Over the 60-year life of the building, there will be changing effects on climate with potential associated risks for human health with more extreme weather conditions. Mitigation measures and future trends, particularly the transition to sustainable transport, should limit such effects in the longer term and contribute to a healthier environment. Mitigation measures have been integral to the building design, construction and operation, including planting and the public realm, to reduce the likely risks associated with health and wellbeing from the predicted changes in weather. During detailed design, further consideration will be made for reducing carbon including for maximising the electrical efficiency (lighting), designing in passive measures (passive ventilation and natural daylight maximisation) and facilitating the use of low carbon plant by end users through futureproofing.

Institutional & Built Environment

- 10.99. The increase in population, taking into account nearby committed developments, was found to have likely cumulative minor adverse impacts on primary healthcare facilities of GPs and dentists. The buildings are proposed with high sustainability design and consistent with a city centre location such that overall effects contribute towards need, and are compatible with, the wider societal infrastructure.

Reference List

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

National Planning Policy Framework (NPPF, updated 2019 & revised 2021)

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Public Health England (PHE) Strategy (2019) *Public Health England (2019) Strategy 2020-2025*

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Public Health England (PHE) Strategy (2019) <https://www.gov.uk/government/publications/phe-strategy-2020-to-2025>

Manchester City Council (MCC) Core Strategy (adopted 2012)
https://secure.manchester.gov.uk/info/200074/planning/3301/core_strategy

Manchester City Council (MCC) First Street Strategic Framework (SDF) (2005, 2007, 2010, 2012, 2015, updated 2018 & Addendum July 2020)

Places for Everyone – Joint Development Plan (Greater Manchester Councils Publication Draft, 2021)
<https://www.greatermanchester-ca.gov.uk/what-we-do/planning-and-housing/places-for-everyone/the-plan/>

Manchester City Council (MCC) Manchester State of the City Report (2020)
https://www.manchester.gov.uk/info/200088/statistics_and_intelligence/8083/state_of_the_city_report_2020

Our Manchester Strategy, Forward to 2025
https://www.manchester.gov.uk/info/100004/the_council_and_democracy/8148/our_manchester_strategy-forward_to_2025

Public Health England (PHE) Spatial Planning for Health (2017) *Public Health England (2017) Spatial Planning for Health: an evidence resource for planning designing healthier places*

Public Health England (PHE) Health Impact Assessment in Spatial Planning (2020)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/929230/HIA_in_Planning_Guide_Sept2020.pdf

The Manchester Strategy - Our Manchester (2016) <https://www.manchester.gov.uk/mcrstrategy>

Manchester Housing Strategy (2022-2032)
https://www.manchester.gov.uk/downloads/download/7463/manchester_housing_strategy_2022-2032

HEMA Cave, B. Fothergill, J., Pyper, R. Gibson, G. and Saunders, P. (2017) *Health in Environmental Impact Assessment: A Primer for a Proportionate Approach*. Ben Cave Associates Ltd, IEMA and the Faculty of Public Health. Lincoln, England www.iema.net
<https://www.iema.net/resources/reading-room/2017/05/01/get-primed-for-health-in-eia>

Shaping Neighbourhoods: For Local Health and Global Sustainability (2010) Barton H, Grant M & Guise R (3rd edition 2021) Taylor & Francis Ltd, England

Wider Determinants of Health Public Health England (PHE) <https://fingertips.phe.org.uk/profile/wider-determinants>

The London Healthy Urban Development Unit (HUDU) 'Healthy Urban Planning Checklist' (2017)

The London Healthy Urban Development Unit (HUDU) 'Rapid Health Impact Assessment (HIA) Tool' (2019)

<https://www.healthyrbandevelopment.nhs.uk/our-services/delivering-healthy-urban-development/health-impact-assessment/>

Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in Environmental Impact Assessment; Determining Significance for Human Health in Environmental Impact Assessment (November 2022)
<https://www.iema.net/>

Manchester City Joint Strategic Needs Assessment (JSNA 2021)
https://www.manchester.gov.uk/info/500230/joint_strategic_needs_assessment

Public Health England (PHE, 2017-2019) <https://fingertips.phe.org.uk/profile/health-profiles>

Office for National Statistics (ONS) for health and life expectancies (2017-2019)

<https://www.ons.gov.uk/peoplepopulationandcommunity>

Manchester City Council

https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/2178/health_and_wellbeing

Manchester City Council https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/438/population

11. Solar Glare

Introduction

- 11.1. This Chapter of the ES has been prepared by GIA and assesses the likely solar glare impacts of the Proposed Development upon the site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.
- 11.2. This Chapter assesses the potential solar glare impact to road and rail (and tram) users only, for sensitive locations within 500m of the Site. Potential solar glare impacts on neighbouring residential amenity is not expected to be significant and an assessment of solar glare to neighbouring buildings is not considered proportionate or necessary. Solar glare effects to occupants of neighbouring buildings is scoped out of the EIA and is not reported upon further within this Chapter.
- 11.3. This Chapter is accompanied by two technical appendices, a solar glare assessment (Appendix 11.1) and a solar glare intensity summary note (Appendix 11.2). This Chapter is accompanied by the following figures:
- Figure 11.1 – Viewpoints assessed for solar glare;
 - Figure 11.2 – Elevations referenced within the assessment.
- 11.4. The author of the chapter has a Masters in Buildings Science (MBS Dist) from Victoria University of Wellington, NZ and 7 years of UK experience in preparing solar glare for EIA developments.

Assumptions and Limitations

- 11.5. Although great care is taken in identifying typical viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of the assessment is limited to the area surrounding the Proposed Development. The occurrence of reflected solar glare at greater distances is not the subject of this assessment.
- 11.6. It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

Legislative and Policy Context, Guidance

- 11.7. There is no legislation, National or Local Planning Policy relevant to Solar Glare.

Guidance

Commission Internationale de L'Eclairage (CIE) 146:2002 & CIE 147:2002 Collection on glare (2002)

- 11.8. The CIE 146:2002 Collection on glare states:

"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low."

"Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows."

Building Research Establishment (BRE) – Site Layout Planning for Daylight and Sunlight: A guide to good practice (2022)

- 11.9. The BRE Guidelines includes the following statement with regard to the potential for reflected solar glare from a new development:
- “Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings...”*

Assessment Methodology and Significance Criteria

Scenarios

Baseline Conditions

- 11.10. The solar glare assessment is undertaken on the worst-case scenario. Solar Glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Proposed Development. Therefore, the assessment considers the effect of the Proposed Development in absolute terms.
- 11.11. However, it should be noted that the Proposed Development will be located on a Site where its existing state is a marketing suite, a small 3-storey brick building with punched windows (Gaddum House) and a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete. As such, there is limited opportunity for instances of solar glare from the Site to be experienced. Solar glare from surrounding buildings is not assessed.

Scenarios Tested

- 11.12. For solar glare, the worst-case scenario is portrayed by the complete and operational Proposed Development, where all reflective facade materials have been installed and any covers, films or hoarding used during the construction period have been removed.
- 11.13. As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects. The construction scenario has been assessed qualitatively, based on professional judgement.
- 11.14. As the Proposed Development is a phased application, there is the potential that changes in the intended construction programme may occur. Due to the location of the buildings in relation to the sensitive viewpoints, and the angles of the facades, based on professional judgement, the residual effects are not expected to differ from those of the fully implemented Proposed Development, Scenario 7. Therefore, it is unlikely that phased solar reflections would be generated in isolation that do not occur in the complete and operational Proposed Development scenario, and the phased solar glare effects are not discussed further within this Chapter.
- 11.15. The following scenario has been technically assessed and is reported on in detail within this chapter of the ES:
- Scenario 7 (Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6).
- 11.16. Based on a common practice approach to portray the worst-case scenario, the cumulative effect will not be considered as neighbouring Committed Developments can block sunlight reaching the facades of the Proposed Development and/or obscure the Proposed Development from the viewpoints to be assessed. However, the following committed developments are included within the surrounding context as their completed form due to their construction having commenced:
- Crown Street Phase 2 (including School) (126668/FO/2020);
 - Viadux (126868/JO/2020);
 - Plot 9 First Street (132600/FO/2021);
 - 10-12 Whitworth Street (111003/FO/2016/C1); and
 - Arundel Street / St George’s Place (123261/FO/2019).

- 11.17. Plot 11 First Street has recently commenced on site and so would be considered within the Baseline. It is located on the edge of the study area, whilst it may be visible within the field of view at some viewpoint, given the distance from the Site it would not obstruct the view of the Proposed Development at any of the assessed viewpoints nor would it shade any of the elevations of the Proposed Development. It was therefore not considered necessary to include the Plot 11 First Street massing within the assessment.

The Study Area

- 11.18. For Solar Glare, sensitive receptors are considered road users at junctions and train (or tram) drivers on tracks within the surrounding area. Viewpoints at road junctions and on train (or tram) lines within 500 metres of the Site where the Proposed Development is visible within the driver's field of view have been identified and assessed. At distances greater than 500m from the Proposed Development, instances of solar glare would be unlikely to occur.
- 11.19. At each of the identified sensitive locations, viewpoints are located at the minimum stopping distance for road users and at the driver's eye level with the focal point being a relevant traffic element, such as signals or incoming traffic. For rail drivers, viewpoints are assessed where signals are visible or at representative intervals where the Proposed Development would be visible close to the direct line of sight for a substantial stretch of track.
- 11.20. The identified road junctions and viewpoints assessed are considered most sensitive in relation to solar glare due to a combination of the nature of the use and proximity to the site, and therefore consideration has been given to several viewpoints at traffic junctions and tram lines from which the Proposed Development will be visible. No train (or tram) driver viewpoints have been identified within 500 metres of the site, where the Proposed Development would be visible within the 60° field of view. The road user viewpoints assessed are indicated in Figure 11.1:
- CHE1 – Chester Road junction with Deansgate Interchange;
 - CHE2 – Chester Road pedestrian crossing
 - CHE3 – Bridgewater Viaduct junction with Deansgate;
 - DG2 – Deansgate junction with Whitworth St West;
 - DG3 – Deansgate junction with Great Bridgewater Street;
 - ES1 – Egerton Street junction with Deansgate Interchange;
 - DGI2 – Deansgate Interchange junction with Chester Road;
 - RS1 – River Street junction with Medlock Street;
 - RS2 – River Street junction with Garwood Street;
 - MS1 – Melbourne Street junction with Great Jackson Street;
 - MW1, MW2 & MW3 – Mancunian Way westbound;
 - MS2 – Medlock Street junction ramp onto Mancunian Way;
 - MW5 – Mancunian Way eastbound;
 - DGIS – Deansgate Interchange ramp onto Mancunian Way; and
 - NV5 – New Vine Street junction with Clarendon Street.

Source of Effect

- 11.21. The façade treatment for the Proposed Development is understood to include large areas of glazing which could reflect sunlight within a driver's field of view at sensitive locations, resulting in potential effects in terms of solar glare.

Methodology for Determining Demolition and Construction Effects

- 11.22. 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 solar glare has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.
- 11.23. The potential solar glare 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 as the cladding is installed. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects.

Methodology for Determining Operational Effects

- 11.24. The technical analyses carried out to inform the assessments and identify possible solar glare effects on road users and train drivers have been undertaken by creating a digital three-dimensional (3D) model of the surrounding area, based on photogrammetry survey data, and insertion of a 3D model of the Proposed Development.
- 11.25. The potential for reflected solar glare or dazzle from the glazed or reflective façade cladding of the Proposed Development has been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the Proposed Development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sun-path at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.
- 11.26. The fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13° of the visual field; the fovea to the central 3°.
- 11.27. Appendix 11.1: Figure 09 highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.
- 11.28. The degrees of vision provide a reference from which potential concerns can be judged. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.
- 11.29. As stated in the CIE 146:2002, occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore, the risk of reflective solar glare causing a hazard is reduced.

Viewpoints for Road Users

- 11.30. As indicated previously, the assessment considers potentially sensitive viewpoints for road users surrounding the Site. The viewpoints are generally located at the minimum stopping distance and at the driver's eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.
- 11.31. Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:
- $$D_{\text{total}} = D_{\text{thinking}} + D_{\text{braking}} = V \cdot T + \frac{V^2}{2\mu \cdot g}$$
- 11.32. Where each component is:
- V = Relevant vehicle speed, typically the road speed limit.
 - T = Thinking time (0.67 sec)
 - μ = Braking effort (considered 0.65 for cars and 0.5 for buses)
 - g = Gravity acceleration.

- 11.33. The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. Appendix 11.1: Figure 07 identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 30 mph (i.e. speed limit for a dense urban location) would be placed at 23m from a traffic light and 1.5m above the ground.
- 11.34. The assessment also considers a driver's field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

Significance Criteria

Evaluating Effects and Significance – Solar Glare

- 11.35. The key terminology used to describe the magnitude of impact is as follows and is further described in the below sections of this chapter:
- Major;
 - Moderate;
 - Minor; and
 - Negligible.
- 11.36. There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. Generally, however, solar reflections at high altitudes are less likely to cause nuisance or distraction.
- 11.37. Professional judgement has therefore been applied to assign the magnitude of impact for solar glare arising from the Proposed Development and to determine the criteria for assessing the significance of solar glare set out in Table 11.1.
- 11.38. The following guide is used to ascertain the possible initial magnitude of impact for each viewpoint assessed. Where reflections occur from multiple façades and from multiple buildings, an initial magnitude of impact is given for each instance of potential solar glare.

Table 11.1: Criteria Used for Determining the Effect of Solar Glare

Significance Guidance	Possible Factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance".
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time.
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.
Major	Solar reflections are visible within 5° of a driver's line of sight.
Note – mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.	

- 11.39. Consideration is then given to mitigating factors that could influence the likelihood of solar reflections resulting in an instance of solar glare, these may include:
- sunlight availability probability;
 - area of façade off which reflections are visible, particularly where the area of reflection visible is less than 8 pixels in diameter and cannot reflect the full solar disc;
 - period of time reflections are visible;
 - angle at which reflections are visible from line of sight;
 - views of the development being obscured; and
 - the time of day at which the solar reflection will occur for example during peak traffic times.

- 11.40. Effects in terms of solar glare can only be adverse (negative) in nature due to this not being a comparative assessment.
- 11.41. All road junctions and tram tracks assessed have been identified as being of high sensitivity as an action is required by a driver that is a safety concern if their visibility is impaired by solar glare. In determining the overall effect at a junction, whilst consideration is given to both controlled and uncontrolled junctions, the later, those where a driver does not have a fixed viewpoint such as a traffic light or where no specific manoeuvres are required by a driver, are less likely to be impacted by solar glare this is a safety concern but are still considered high risk.
- 11.42. As the sensitive receptor is a driver approaching a road junction, multiple viewpoints at any one junction may be assessed for each of the traffic lanes or signals affected. In terms of significance criteria however, professional judgement has been used to determine the overall effect at the junction as a whole, taking into consideration the effects at all viewpoints assessed for that junction. Similarly for train drivers, the overall effect is reported for the stretch of track assessed as a whole. Therefore, following the initial magnitude of an effect for each viewpoint and consideration of mitigating factors, a clear statement is then made as to whether the overall effect is significant or not significant. As a general rule, the following criteria is applied:
- 'Moderate' or 'major' effects are deemed to be 'significant';
 - 'Minor' effects are considered to be 'not significant', although they may be a matter of local concern; and
 - 'Negligible' effects are considered to be 'not significant' and not a matter of local or wider concern.

Identification and Evaluation of Likely Significant Effects

Embedded Mitigation

- 11.43. Owing to the proximity of the EIA Site to several sensitive road locations, as well as the highly glazed nature of the Proposed Development, a comprehensive, iterative review process was undertaken to incorporate mitigation strategies within the detailed façade design.
- 11.44. The iterative review process has run alongside the development of the façades from the early massing stages and has comprised of an initial massing review, whereby the massing was tested to identify which nearby junctions are most sensitive to reflections and identify any facades that would likely require strategies deployed to reduce the area and intensity of any reflections. Then as the façade design progressed, the façade strategies were reviewed to ensure the embedded solar glare mitigation reduced the risk of solar glare as much as possible.
- 11.45. Numerous options were explored to break up reflections and lower the intensity of any reflections that occurred. This included:
- the use of anodised aluminium panels with a non-specular finish and purge ventilation panels to break up reflections;
 - angling of glazed panels for the Crown St Phase 3 towers so that large areas of flat glazing of the same angle are avoided and that each panel is at an alternative angle from the panels next to it thus reflecting sunlight at a different time to the adjacent panel; and
 - use of low reflectance glazing.

- 11.46. Therefore, the assessments reported within this ES Chapter have been undertaken on a scheme that has been fine-tuned to address potential solar glare risks as much as possible. However, as with any tall building within a low-rise context, the Proposed Development is visible from some distance and sits within the field of view for drivers at several nearby junctions. It is likely that solar reflections may be unavoidable at all junctions, so the façade design has sought to limit the area of reflections and their intensity to minimise the risk of solar reflections resulting in an instance of solar glare being generated by the buildings' facades.

Construction & Demolition

- 11.47. The likely effects in relation to solar glare for the surrounding road users and train drivers would vary throughout the demolition and construction works, depending on the installation of reflective façade materials.
- 11.48. The effects during the demolition works is considered negligible. As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational, as presented below. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects.
- 11.49. As such, the overall effect in terms of solar glare would range from being temporary negligible effects during demolition, then gradually changing to permanent, moderate adverse and significant, once the Proposed Development is complete, as set out in the assessment of the Proposed Development scenario below.

Proposed Development (Scenario 7)

- 11.50. The full solar glare assessment is provided in Technical Appendix 11.1
- 11.51. The assessment has been undertaken from nearby road locations which are considered sensitive in terms of solar glare. These include traffic junctions, pedestrian crossings and motorway locations. At locations where there is more than one traffic signal from which the Proposed Development is visible, several viewpoints have been tested (noted by the reference a, b, c etc.) in order to have a better understanding of the likely impact that the Proposed Development might have upon road users' responsiveness. The number of viewpoints tested per location varies according to the number of lanes, direction of travel and number of traffic lights. This is specified in the discussion below, where appropriate.
- 11.52. Following a review of an extended area of investigation (approximately 500m radius from the Proposed Development), a total of 17 road locations were assessed. The assessment considers the potential occurrence of solar reflections from the Proposed Development owing to its size and large areas of glazing on the façade at these locations. The duration of solar reflections as well as their proximity to a road driver's line of sight have been considered within the discussion below.
- 11.53. The assessment has been undertaken in a worst-case scenario considering there is no cloud cover, so the sun is shining for all days of the year for the full duration of daylight hours.
- 11.54. Of the total 17 road locations, a total of 11 locations have at least one viewpoint which sees the potential for solar glare within 30° of a road users' line of sight but greater than 10°. At these 11 locations, the effect is considered to be permanent, Minor Adverse and not significant. These road locations are listed below and are not discussed further within the Chapter:
- CHE1 – Chester Road junction with Deansgate Interchange;
 - CHE3 – Bridgewater Viaduct junction with Deansgate;
 - DG2 – Deansgate junction with Whitworth St W;
 - DG3 – Deansgate junction with Great Bridgewater Street;
 - ES1 – Egerton Street junction with Deansgate Interchange;
 - DGI2 – Deansgate Interchange junction with Chester Road;
 - RS1 – River Street junction with Medlock Street;
 - RS2 – River Street junction with Garwood Street;
 - MW3 – Mancunian Way westbound;
 - MW5 – Mancunian Way eastbound; and
 - NV5 – New Vine Street junction with Clarendon Street.

- 11.55. At the remaining six locations, reflections occur within 10° of a road user's line of sight which require further consideration.

Chester Road (CHE2) – Pedestrian Crossing

- 11.56. Two viewpoints have been assessed at this junction, CHE2a and CHE2b. Viewpoint CHE2a shows the view of drivers in the left lane looking at the left side traffic lights, whilst viewpoint CHE2b shows drivers in the right lane looking at the right side traffic lights. There is a second traffic light on the right side, on the opposite side of the junction primarily for use by stationary vehicles.
- 11.57. Table 11.2 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.
- 11.58. Reflections at viewpoint CHE2a are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.2 – Summary of Potential Reflections at Chester Road (CHE2)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
CHE2b	GJS Plot D Southern Elevation	07:00 – 08:00 GMT	Mid-January to mid-March and mid-September to mid-November	From 5°	Moderate Adverse
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

- 11.59. At this junction, for both viewpoints assessed:
- Reflections occurring at one of the viewpoints (CHE2a) are well outside the direct line of sight and so would not impact driver visibility.
 - When reflections are seen behind the right side traffic lights (viewpoint CHE2b), drivers can rely on the alternative traffic lights on the left side of the road to respond safely at this junction.
 - The reflections occur from only a thin strip within the field of view, and at a glancing angle, therefore the area of each panel is very small within the field of view.
 - Anodised aluminium screens have been distributed across the GJS Plot D elevations to break up reflections and lower the intensity of any reflections that do occur.
 - Deciduous trees are located behind the right side traffic lights and would obscure the portion of façade generating reflections within 10°. Historic imagery shows that trees would be in leaf in the mid-September to mid-November period but during the mid-January to mid-March period, leaf growth would be limited. Whilst the trees would not be in leaf for some of the time reflections could occur, the dense branches would still help break up reflections below the visor cut-off line.
 - The sun path sits within the field of view of a driver at this junction, once implemented the Proposed Development will partially obscure the direct view of the sun. Any reflections visible from the Proposed Development would be significantly less intense than a view of the direct sun as is currently experienced at this viewpoint. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
 - The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 30%.

11.60. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers approaching the Chester Road pedestrian crossing is considered to be **permanent, Minor Adverse** and **not significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction.

Melbourne Street (MS1) – Junction with Great Jackson Street

11.61. One viewpoint has been assessed at this junction, MS1. There is just one lane of traffic, and this is not a controlled junction, therefore the viewpoint assessed (MS1) shows the view of drivers looking forward as they approach the junction.

11.62. Table 11.3 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

Table 11.3 – Summary of Potential Reflections at Melbourne Street (MS1)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
MS1	CS Phase 3 Plot E2 Podium	15:00 – just after 16:00 GMT	Early-January to mid-February and mid-October to late-November	From 3°	Major
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.63. At this junction, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development.
- The majority of potential reflections occur above the driver's visor line, which would mitigate the majority of effects when deployed.
- Reflections occur from a small area, with just three glazed panels capable of generating reflections towards a driver at this junction.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 30%.

- 11.64. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers at the junction of Melbourne Street with Great Jackson Street is considered to be **permanent, Moderate Adverse and significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction. This is based on a worst-case scenario that assumes high reflectivity glazing.

Mancunian Way (MW1) – Westbound over Medlock Street junction

- 11.65. There are two lanes of traffic travelling westbound on Mancunian Way, the viewpoint assessed is not a junction but has been assessed due to the sensitive nature of this motorway and its proximity to the Site. Viewpoint MW1 shows the view of drivers in the right lane, looking forward as the travel along this road. This viewpoint shows the view of drivers as they pass over the Medlock Street junction.
- 11.66. Table 11.4 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

Table 11.4 – Summary of Potential Reflections at Mancunian Way (MW1)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
MW1	GJS Plot D Office Eastern Elevation	06:00 – 07:00 GMT	Mid-February to late-March and early-September to mid-October	Very small area from 0°	Major
	GJS Plot D Resi Tower Eastern Elevation	06:00 – 07:00 GMT	Mid-February to late-March and early-September to mid-October	From 1°	Major
	CS Phase 3 Plot C7 South-eastern Elevation	15:00 – 17:00 GMT	Mid-January to mid-March and mid-September to mid-November	Scattered inter-reflections and very thin strips from 7°	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

- 11.67. At this location, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development.
- The majority of potential reflections occur above the driver's visor line, which would mitigate the majority of effects when deployed.
- Reflections from GJS Plot D office are from a very small area so would only occur for a very short period of time.
- Anodised aluminium screens have been distributed across the GJS Plot D tower elevations to break up reflections and lower the intensity of any reflections that do occur.
- The sun path sits within the field of view of a driver at this junction, once implemented the Proposed Development will partially obscure the direct view of the sun. Any reflections visible from the Proposed Development would be significantly less intense than a view of the direct sun as is currently experienced at this viewpoint. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 40%.

- 11.68. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers on Mancunian Way above the Medlock Street junction is considered to be **permanent, Moderate Adverse** and **significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction. This is based on a worst-case scenario that assumes high reflectivity glazing.

Mancunian Way (MW2) – Westbound approaching merge with slip road traffic

- 11.69. There are two lanes of traffic travelling westbound on Mancunian Way, the viewpoint assessed is not a junction but has been assessed due to the sensitive nature of this motorway and its proximity to the Site. Viewpoint MW2 shows the view of drivers in the right lane, looking forward as the travel along this road. This viewpoint shows the view of drivers as they approach traffic merging from the Medlock Street Junction slip-road.
- 11.70. Table 11.5 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

Table 11.5 – Summary of Potential Reflections at Mancunian Way (MW2)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
MW2	GJS Plot D Office Southern Elevation	18:00 to 19:00 GMT	Mid-March to mid-April and mid-August to mid-September	9° to 10°	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

- 11.71. At this location, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development.
- The reflections occur from only very small areas within the field of view, and at a glancing angle, therefore the area of each panel is very small within the field of view.
- The sun path sits within the field of view of a driver at this junction. Any reflections visible from the Proposed Development would be significantly less intense than a view of the direct sun as is currently experienced at this viewpoint. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 30%.

11.72. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers at the junction of Mancunian Way with merging traffic from the slip road is considered to be **permanent, Minor Adverse** and **not significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction.

Medlock Street junction (MS2) – Ramp onto Mancunian Way westbound

11.73. One viewpoint has been assessed on this slip-road as it approaches the junction with Mancunian Way, MS2. There is just one lane of traffic, and this is not a controlled junction, therefore the viewpoint assessed (MS2) shows the view of drivers look forward as they approach the junction.

11.74. Table 11.6 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

Table 11.6 – Summary of Potential Reflections at Medlock Street (MS2)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
MS2	GJS Plot D Office Southern Elevation	18:00 to 19:00 GMT	Mid-March to mid-April and mid-August to mid-September	Very small areas between 6° and 7°	Moderate
	GJS Plot D Resi Tower Southern Elevation	18:00 to 19:00 GMT	Mid-March to mid-April and mid-August to mid-September	Very thin strip from 7°	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.75. At this location, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development.
- The reflections occur from only a thin strip within the field of view, and at a glancing angle, therefore the area of each panel is very small within the field of view.
- Anodised aluminium screens have been distributed across the GJS Plot D elevations to break up reflections and lower the intensity of any reflections that do occur.
- The sun path sits within the field of view of a driver at this viewpoint. Any reflections visible from the Proposed Development would be significantly less intense than a view of the direct sun as is currently experienced at this viewpoint. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 30%.

- 11.76. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers at the junction of Medlock Street ramp onto Mancunian Way is considered to be **permanent, Minor Adverse** and **not significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction.

Deansgate Interchange Slip-road (DGIS) – Ramp onto Mancunian Way eastbound

- 11.77. One viewpoint has been assessed on this slip-road as it approaches the junction with Mancunian Way, DGI. There is just one lane of traffic, and this is not a controlled junction, therefore the viewpoint assessed (DGI) shows the view of drivers look forward as they approach the junction.
- 11.78. Table 11.7 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

Table 11.7 – Summary of Potential Reflections at Deansgate Interchange Slip-road (DGIS)

Viewpoint	Elevation	Times of the day that reflections occur	Times of the year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
DGIS	GJS Plot D Office Southern Elevation	07:00 - 08:00 GMT	Mid-February to mid-March and mid-September to mid-October	Small area between 6° and 7°	Moderate
	GJS Plot D Office Western Elevation	16:00 – 18:00 GMT	Mid-February to mid-March and mid-September to mid-October	Small area from 7°	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

- 11.79. At this location, for the viewpoint assessed:
- There are no signals where visibility can be affected by reflections from the Proposed Development.
 - The reflections occur from only very small areas within the field of view, and those closest to the direct line of sight are at a glancing angle, therefore the area of reflection is very small within the field of view and would only reflect the solar disc for a very short period of time.
 - The sun path sits within the field of view of a driver at this junction. Any reflections visible from the Proposed Development would be significantly less intense than a view of the direct sun as is currently experienced at this viewpoint. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.

- 11.80. Therefore, based on professional judgement, in consideration of the initial magnitude of potential effects and the factors outlined above, the overall effect in terms of solar glare to drivers at the junction of Deansgate Interchange slip-road with Mancunian Way is considered to be **permanent, Minor Adverse** and **not significant**. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 23 metres from the junction.

Mitigation Measures

- 11.81. As detailed in para 11.43 to 11.46 of this Chapter, the design has evolved with solar glare effects in mind through the inclusion of angled glazing, non-specular anodised aluminium panels and screens to break up potential reflections. As such, potential effects have been mitigated by design to be lower intensity, reducing the potential for the reflections to result in an occurrence of solar glare.
- 11.82. Permanent, significant adverse effects are predicted to occur for a driver at two road locations, given the location of the site and scale of the development, potential for reflections from the Proposed Development are unavoidable. It should be noted that the assessment considers a scenario whereby the sun shines on every day of the year to consider all potential circumstances in which reflections will occur (i.e. 'worst case'). According to the sunlight availability protractor, based on UK weather data, the sunshine probability will be significantly reduced and therefore the likelihood of the instances of reflections are considerably reduced. The probability of the sun shining during the times of the year when potential reflections are expected to occur ranges from 10% in the early mornings/mid-afternoons from the mid-seasons through winter months, up to 40% in the mid-seasons in the afternoon.
- 11.83. Furthermore, the assessment does not include the sun itself within any viewpoints which would also cause very intense glare to drivers at many of the affected viewpoints. For the majority of viewpoints, the sun would be directly visible at other times of the day if the Proposed Development were not present as seen in the solar glare assessment in Appendix 11.1. In comparison, the reflections from the Proposed Development would appear less intense and would not cause significantly worse effects when compared with a direct view of the sun.
- 11.84. The assessment has been based on a worst-case scenario that assumes high reflectivity glazing.
- 11.85. Subsequent to the standard EIA solar glare assessments, more detailed supplementary solar glare intensity studies have been undertaken, and are reported upon in Appendix 11.2, to establish whether the reflections that do occur are of low intensity and below the threshold for glare. The detailed solar glare intensity study has determined that provided a low Visible Light Reflectance (VLR) glazing is used on the Great Jackson Street elevation of the Crown Street Phase 3 Plot E2 podium and the eastern elevation of the Great Jackson Street tower, the intensity of reflections are not considered to result in an instance of solar glare. The maximum VLR for the glazing, as determined by the supplementary solar glare intensity studies, is 16% for the podium glazing and 14% for the residential glazing. Appendix 11.2 provides a summary demonstrating that glazing below these VLR thresholds would not result in glare and therefore would not impact the visibility of drivers at the two locations where significant effects have been reported, the impact at these two locations would be reduced to minor adverse and not significant.
- 11.86. Due to the design of the facades already including extensive mitigation and the effectiveness of low VLR glazing at preventing an instance of solar glare occurring, there are no further façade design mitigation measures proposed for the Proposed Development.

Residual Effects

- 11.87. The likely significant effects of solar glare from the Proposed Development described above are considered a worst-case scenario. All solar glare effects are considered moderate to high sensitivity depending on whether it is a controlled junction or not, and the effects are permanent and long term, therefore the residual effects are the same as during the operational stage.

Table 11.8 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase

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 to Moderate adverse and significant effects on Solar Glare	Road users at nearby road junctions	None	N/A	Negligible to Minor adverse and significant effects on Solar Glare

Table 11.9 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	Embedded in the design, no further mitigation needed.	N/A	Minor adverse and not significant effects on Solar Glare
Moderate adverse and significant effects on Solar Glare	Road users at MS1 and MW1 road junctions	Para 11.85: Proposed Glazing Specifications should be low reflectance to elevations specified, the VLR thresholds are 16% for the Plot E2 podium glazing and 14% for the Plot D eastern elevation residential glazing.	Planning Condition	Minor adverse and not significant effects on Solar Glare

Reference List

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

- Commission Internationale De L'Eclairage (CIE), CIE 146:2002 & CIE 147:2002 - Collection on Glare, CIE, 2002
- Building Research Establishment (BRE), Site Layout Planning for Daylight and Sunlight: A guide to good practice, Third Edition, BRE, 2023

12. Townscape and Visual Impact Assessment

Introduction

12.1 This Chapter of the ES has been prepared by Chris Burnett Associates and assesses the likely significant effects of the Proposed Development with respect to Townscape and Visual amenity. This Chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the Site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; cumulative effects and the likely residual effects. Technical appendices also support this assessment and consist of the following:

- Appendix 12.1: Maps
- Appendix 12.2: Viewpoint and townscape photographs including AVR images
- Appendix 12.3: Visualisation methodology
- Appendix 12.4 AVR Methodology

12.2 Chris Burnett BSC BLD CMLI, is principal partner of Chris Burnett Associates, a registered practice of landscape architects, who specialises in tall building Townscape and Visual Impact Assessments, as part of Environmental Statements, for many tall building developments throughout the UK since 2002. This includes over 20 tall buildings all of which have received planning consent, in Manchester and Salford including Beetham Hilton, Deansgate Square, New Wakefield Street and others.

Limitations and Assumptions

12.3 The principal limitation as far as the field survey work was concerned has been that photography was undertaken in the summer and autumn months when the extent of foliage on trees is at its maximum and therefore reflects a best case scenario in terms of visibility but only a limited number of views are affected.

12.4 For the purposes of this TVIA the assessment of effects testing scenarios will test the construction and operational effects of:

- The worst case scenario which includes Scenario 1 and & also Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative

12.5 We have also been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this scenario and judge that the changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the overall phasing, as set out in the phasing and delivery section of the Report.

Legislative and Policy Context

Legislation

- 12.6 The European Landscape Convention (ELC, 2000)¹ provides a foundation for closer co-operation on landscape issues across Europe and was ratified in the UK on the 21 November 2006 and became binding on 1 March 2007. The convention identifies the need to recognise landscape in law, to develop and promote landscape policies dedicated to the protection, management and creation of landscapes, and to establish procedures for the participation of the general public and other stakeholders in the evolution and implementation of landscape policies. It also encourages the integration of landscape into all relevant areas of policy, including cultural, economic and social policies.
- 12.7 The ELC defines landscape under Article 1 as ‘an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors’. It recognises that landscape has important cultural, ecological, environmental and social dimensions and is a key element of achieving sustainable development. Article 3 states that the aims of the Convention are to promote landscape protection, management and planning and to organise European co-operation on landscape issues.

National Planning Policy

- 12.8 The National Planning Policy Framework² sets out the Government’s planning policies for England and how these are expected to be applied. It sets out the Government’s requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
- 12.9 Key aspects of the NPPF, revised in 2021, which apply to the Townscape and Visual Impact Assessment are the paragraphs 126 and 130 below:

Para.126 *The creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities. Being clear about design expectations, and how these will be tested, is essential for achieving this. So too is effective engagement between applicants, communities, local planning authorities and other interests throughout the process.*

Para. 130 Planning policies and decisions should ensure that developments:

a) will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;

b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;

c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);

¹ Ref 9.1 The European Landscape Convention (ELC 2000)

² Ref 6.2 National Planning Policy Framework 2021 Dept Communities and Local Government

d) establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;

e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and

f) 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 users⁴⁶; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.

Local planning policy

12.10 The following relevant policies are set out below as extracts from Manchester City Council's Core Strategy³:

12.11 "The Core Strategy was adopted by Manchester City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework and covers a period of 15 years from 2012 to 2027. It describes Manchester today and outlines the Council's vision for Manchester in 2027 along with the planning policies which will be used to deliver that vision⁴.

Policy EN 1 - Design Principles and Strategic Character Areas

All development in Manchester will be expected to follow the seven principles of urban design, as identified in national planning guidance and listed above and have regard to the strategic character area in which the development is located. Opportunities for good design to enhance the overall image of the City should be fully realised, particularly on major radial and orbital road and rail routes. Design and Access Statements submitted with proposals for new development must clearly detail how the proposed development addresses the design principles, reinforces and enhances the local character of that part of the City and supports the achievement of the Core Strategy Strategic Objectives."

Policy CC6 High Density Development

City Centre High Density Development City Centre development will generally be high-density. It is a location where land should be used to maximise its efficiency. The appropriate scale, massing and height of development in the City Centre will significantly exceed what is appropriate elsewhere in the City. Development will need to have regard to the Council's approach to tall buildings (policy EN2), but any proposals which do not reflect the importance of maximising the development opportunities in the City Centre will only be supported where this accords with wider Core Strategy objectives

Policy CC 9 Design and Heritage

Design of new buildings will need to be of the highest standard in terms of appearance and function. The standards and guidance explained in other LDF policies should be the basis for the approach to design, with particular attention to be given to the City Centre context and character. Development in Manchester City Centre should preserve or enhance the heritage assets that have been identified, including listed buildings, conservation areas and scheduled ancient monuments. The Council will support high density and mixed use development in the City Centre, but developers must recognise the specific design challenges that must be overcome to ensure complementarity of function and form. New development must support the range of uses the

³ Manchester City Council Core Strategy 2012-2027

⁴ Manchester City Council Core Strategy 2012-2027

Council expects in the City Centre and contribute to a coherent and integrated physical environment.

- 12.12 The City Centre Character Area is of relevance to the Proposed Development. This area has been broken down into distinct townscape character zones by Manchester City Council and the extent and nature of the impact of the Proposed Development on these zones is described in more detail later in this chapter. The Core Strategy also refers to tall buildings:

Policy EN2 - Tall Buildings

Tall buildings are defined as buildings which are substantially taller than their neighbourhoods and/or which significantly change the skyline.

Proposals for tall buildings will be supported where it can be demonstrated that they

- Are of excellent design quality,*
- Are appropriately located,*
- Contribute positively to sustainability,*
- Contribute positively to place making, for example as a landmark, by terminating a view, or by signposting a facility of significance, and*
- Will bring significant regeneration benefits.*

A fundamental design objective will be to ensure that tall buildings complement the City's key existing building assets and make a positive contribution to the evolution of a unique, attractive and distinctive Manchester, including to its skyline and approach views.

Suitable locations will include sites within and immediately adjacent to the City Centre with particular encouragement given to non-conservation areas and sites which can easily be served by public transport nodes.

Elsewhere within Manchester tall building development will only be supported where, in addition to the requirements listed above, it can be shown to play a positive role in a coordinated place-making approach to a wider area. Suitable locations are likely to relate to existing district centres. The height of tall buildings in such locations should relate more to the local, rather than the City Centre, urban context.

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.

It will be necessary for the applicant/developer to demonstrate that proposals for tall buildings are viable and deliverable"

- 12.13 Significantly, the Core Strategy offers further guidance in relation to the development of tall buildings as follows:-

Tall Buildings can provide a sense of place and distinctiveness, however as high development can have a substantial impact on an area careful consideration should be given to each proposal.

The NPPF requires local authorities to have regard to best practice in design, such as "By Design - Urban Design in the Planning System: Towards better practice" and "By Design – Better places to live". Policies are not to be overly prescriptive but, amongst other things, should concentrate on

guiding height in relation to neighbouring buildings and the local area in general. Innovation should not be stifled but local distinctiveness should be reinforced. PPS4 directs planning authorities to set flexible policies for their centres which can respond to changing economic circumstances and encourage where appropriate high density development accessible by public transport, walking and cycling.

In the context of ensuring sustainable development, the City Centre is clearly a location that requires the prudent use of scarce land resources. It is generally well served by public transport and one where a high density of development is consistent with its distinctive character. The City Centre is, in general, considered an appropriate area for tall buildings. The growth of the City Centre is still evolving, particularly in relation to the development of fringe sites, and proposals need to be considered having regard to the character of the places in which they are proposed. Therefore, whilst some parts of the City Centre are more or less likely to be suitable for tall buildings, the Council does not consider a site specific policy that identifies detailed locations for a tall building to be appropriate. The Council is aware that over the 15 year plan period there is a need to be flexible and to be able to respond to changing economic conditions. The above criteria based policy is therefore set out, which will together with other design policies, form the policy context against which all proposals for tall buildings will be considered.

Elsewhere across the City, District Centres may be appropriate locations for "tall" buildings. Being generally accessible to the local population and well served by public transport, they are natural foci for developments that attract a larger number of people. The definition of tall as being in relation to neighbouring buildings should be noted, however, as the scale of development acceptable within a District Centre is unlikely ever to match that within the City Centre.

Tall buildings by their very nature can dominate the street scene and be highly visible over long distances. They can also have an impact on the local micro-climatic conditions, for example, by creating wind tunnels. It is for these reasons that it is considered particularly important that they are designed to the highest quality, both in terms of appearance and their impact on the functioning of surrounding space."

Policy EN3 - Heritage

Throughout the City, the Council will encourage development that complements and takes advantage of the distinct historic and heritage features of its districts and neighbourhoods, including those of the City Centre.

New developments must be designed so as to support the Council in preserving or, where possible, enhancing the historic environment, the character, setting and accessibility of areas and buildings of acknowledged importance, including scheduled ancient monuments, listed buildings, registered parks and gardens, conservation areas and archaeological remains.

Proposals which enable the re-use of heritage assets will be encouraged where they are considered consistent with the significance of the heritage asset."

Assessment Methodology and Significance Criteria

- 12.14 This assessment has been undertaken alongside an assessment of the Historic Built Environment which assesses the impact of the Proposed Development on the heritage assets and the surrounding built environment. This chapter assesses the impact of the Proposed Development over a wider area and assesses it against townscape character and visual amenity.

Study Area

- 12.15 The study area for this assessment comprises an area of approximately 1km in radius focussed on the Proposed Development Site. This area is judged to be appropriate given the height of the Proposed Development, the prevailing topography of surrounding area and its location. Outside this zone townscape and visual effects are unlikely to be significant due to distance, the effects of urban grain and street pattern and also the proximity of a number of intervening tall buildings.

Baseline Surveys

Desk Based Research

- 12.16 Research included establishing a Zone of Theoretical Visibility (ZTV) and examining appropriate guidance and policies on tall buildings issued by Manchester City Council (MCC) and relevant authorities such as Historic England.

Field Surveys

- 12.17 Field surveys were undertaken to explore the current baseline of Manchester City Centre. The survey was based on zones using the template set out in Manchester Residential Quality Guidance⁵. Broad Townscape Character Zones were also defined which lie outside the City Centre. During the field survey the ZTV was confirmed and a series of Representative Viewpoints established for assessment, all subsequently subject to Accurate Visual Representation (AVR).

Consultations

- 12.18 Manchester City Council were consulted on the proposed location of all viewpoints and agreement was reached on their selection in November 2022.

Method of Assessing Significance

- 12.19 The Townscape and Visual Impact Assessment (TVIA) was undertaken in accordance with the methodology and approach set out in the 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) Third Edition' (2013) – produced by the Landscape Institute (LI) and IEMA.⁶

“The GLVIA requires that a clear distinction is drawn between landscape (which includes the urban townscape) and visual effects:

- *Townscape effects relate to the degree of change to characteristics or physical components of an urban area, which together form the character of that townscape, e.g. topography, buildings and vegetation.*
- *Visual effects relate to the degree of change to an individual receptor's or a receptor group's view of that townscape, e.g. local residents, users of public footpaths or motorists passing through the area.”*
- *The relationship between the effects of the Proposed Development on Townscape and Visual Issues are interdependent but not exclusively so. The effects will therefore be examined in terms of:*
- *Effects on Townscape character. For the purposes of this study the area immediately around the Proposed Development is examined on a character area basis based on the zonal template used by Manchester City Council. Character areas are shown on City Centre Character Areas and Viewpoint Locations, which is located at Appendix 6.1.*

⁵ Ref 6.4 Manchester Residential Quality Guidance MCC 2017

⁶ Ref 5.5 Guidelines for Landscape and Visual Impact Assessment 3rd Edition 2013 landscape Institute and Institute of Environmental Management and Assessment

- *Effects on visual receptors. This is examined through the Representative Viewpoint Approach in which the effects of the Proposed Development are assessed in short, medium and long distance views from variety of key locations.*

12.20 In addition, the following guidance documents have also been consulted:

- Guidance on tall buildings published by Historic England: Advice Note 4⁷ March 2022
- History in the View prepared for English Heritage by LUC in 2011
- Manchester Residential Quality Guidance⁸

12.21 The guidance contained in Historic England's advice note on Tall Buildings is particularly relevant:

"Tall buildings need to set exemplary standards in design because of their scale, mass, wide impact and likely longevity. Good design will take the opportunities available for improving the character and quality of an area and respond to local character and history (NPPF paragraphs 58 and 64). It is important that the required high standard of architectural quality is maintained throughout the process of procurement, detailed design, and construction, through the use of conditions and reserved matters.

Given their likely impact on a wide area, it is important that social and environmental effects are also assessed. Consideration needs to be given to a tall building's contribution to public space and facilities. This applies both internally and externally, including the provision of a mix of uses (especially on the ground floor of towers), as part of a well-designed public realm. Consideration of the impact on the local environment is also important, including microclimate, overshadowing, night-time appearance, light pollution, vehicle movements, the environment and amenity of those in the vicinity of the building, and the impact on the pedestrian experience. Well-designed tall buildings provide an inclusive environment, both internally and externally, taking opportunities to offer improved permeability, accessibility and, where appropriate, the opening up or effective closure of views to improve the legibility of the wider townscape."

Townscape Character effects

12.22 The assessment of the Proposed Development on Townscape Character has been based on Manchester City Centre Zones, revised in Manchester Residential Quality Guidance as Neighbourhood Zones, and supplemented by those which lie outside the City Centre. It includes an assessment of the elements which comprise it such as built form and styles, urban grain and street pattern, soft elements such as green spaces and trees and a sense of place and effect that the Proposed Development is judged to have on them. The following zones are potentially affected:

Manchester City Centre Neighbourhood and Townscape Character Zones

- Civic Quarter
- Spinningfields
- Petersfield
- Castlefield
- Water Street
- First Street
- Hulme
- Corridor Manchester
- Great Jackson Street

⁷ Ref 5.6

Historic England note on Tall Buildings 2022

⁸ Op Cit.5.4

Manchester Residential Quality Guidance MCC 2017

- The Village
- 12.23 Their extent is defined on the map of City Centre Character Areas and Viewpoint Locations (**Appendix 12.1**) and they are described in more detail in the corresponding baseline condition section.
- 12.24 Townscape effects can be characterised as the changes in the urban grain, character and condition of the townscape as a result of the impact of a development. Specifically, the assessment will examine:
- Direct effects on specific townscape elements
 - Effects that are more subtle in nature which affect the character of the townscape
 - Effects on a designated asset such as a World Heritage Site, Listed Building or Conservation Area or tourist landmark.

Visual Effects

- 12.25 The Zone of Theoretical Visibility (ZTV), in the context of the surrounding topography and the height of the Proposed Development, has been established initially through 3D modelling using current Lidar DSM data combined with 10K base mapping to produce a Zone of Theoretical Visibility (ZTV) map, Viewshed Analysis and Viewshed Locations in **Appendix 12.1**, and then confirmed as part of the field work exercise. Taking into account the scale and height of the Proposed Development, it covers most of the city centre and provides a quick guide as to the Proposed Development's visibility in the immediate vicinity.
- 12.26 As with other Townscape and Visual Impact Assessments, and in accordance with guidance issued in GLVIA, the accepted practice of selecting and assessing a range of "Representative Viewpoints", all publicly accessible, has been adopted. This is the most appropriate and practical method of assessing and understanding the visual impact of the Proposed Development. The viewpoint locations are marked in **Appendix 12.1** on the ZTV map and also City Centre Character Areas and Viewpoint Locations map and are illustrated by way of photographs taken from these viewpoints, represented in **Appendix 12.2**.
- 12.27 Representative Viewpoints are, by their very nature, representative and not necessarily site specific, unless a townscape or visual effect from an important regional landmark i.e. Albert Square, is predicted. In each case a view was sought where the Proposed Development was visible, guided by the results of the ZTV. Viewpoints were selected to cover a number of different locations and varying distances, to reflect the experience of different types of visual receptor and viewing distance. Accordingly, viewpoints ranged from immediate proximity to the Proposed Development site and included residential streets, pedestrianized precincts, public squares footpaths and main approach and ring roads.
- 12.28 During the main field assessment process which occurred in October 2022, baseline viewpoint photographs were initially taken using a Canon EOS DSLR camera, for consultation purposes, but then subsequently retaken by Ambiente using a Canon 5D MkII FFS with a Canon 24 TS-E Mk II 24mm lens. Full justification for the use of this camera and lens, together with recommendations on presentation and viewing distance are contained in **Appendix 12.3 Visualization Methodology** and **Appendix 12.4 AVR Methodology**.
- 12.29 The effect of the Proposed Development is then assessed from each of the viewpoints using the information on the height of the building provided by the architects Simpson Haugh and the accurate interpretation of this information by Ambiente in the form of a series of Accurate Visual Representation (AVR) Type 4 fully rendered or white block mass images of the Proposed Development superimposed onto photographs taken from each viewpoint.

Defining Significance of Effect

- 12.30 The significance of townscape and visual effects can broadly be determined by the interaction of the sensitivity of the receptor and the magnitude of effect with professional judgement playing an important part in identifying the overall significance values for each receptor.

Townscape: Sensitivity of Receptor

- 12.31 The sensitivity of a townscape receptor is an expression of its ability to accommodate the Proposed Development. Sensitivity is a judgement based on a combination of the susceptibility of the type of change or development proposed and the value attached to the townscape, as set out below.
- 12.32 Susceptibility indicates the ability of a defined townscape receptor to accommodate the proposed development “without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.” (GLVIA, 3rd version). A description of how susceptibility would be evaluated for each receptor type is included below:

Table 12.1 Susceptibility of Townscape Receptor

Susceptibility	Criteria
High	Little ability to accommodate the proposed development without undue harm.
Medium	Some ability to accommodate the proposed development without undue harm.
Low	Substantial ability to accommodate the proposed development without undue harm.

- 12.33 Townscape Value is “*the relative value that is attached to different landscapes by society*”. It is assessed on the following scale along with assessment of various undesignated townscape attributes:

Table 12.2 Townscape Value

Value	Description
High	Sites, features or areas of national or international importance with settings of high quality such as World Heritage Site, AONB, National Parks, Grade I and Grade II* Listed buildings or Registered Parks and Gardens.
Medium	Sites, features or areas of local or regional importance with intact character such as Grade II* and Grade II Listed Buildings or Registered Parks and Gardens, Conservation Areas, Scheduled Monuments, local nature site, long distance recreational routes. Tree Preservation Orders (TPO) and local designations that exhibit wider geographic, cultural or townscape significance.
Low	Areas or features of local importance such as Tree Preservation Orders (TPO), Public Right of Way (PROW) and locally listed buildings.

- 12.34 The overall sensitivity of each townscape receptor would be rated within the range of High-Medium-Low and would be informed by combining the susceptibility and value as described above.

Townscape: Magnitude of Effect

- 12.35 The magnitude of a townscape effect is assessed in terms of its size or scale, the geographical extent of the area influenced by that effect, and its duration and degree of reversibility and would be rated within the range of Major-Moderate-Minor-Negligible-No Change set out below:

Table 12.3 Magnitude of Townscape Effect

Category	Criteria
Major adverse townscape effect	The proposals will result in a total change in the key characteristics of townscape character; will introduce elements totally uncharacteristic to the attributes of the receiving townscape; and/or will result in a substantial or total loss, alteration or addition of key elements/features/characteristics.
Moderate adverse townscape effect	The proposals will result in a partial change in the key characteristics of townscape character; will introduce elements partially uncharacteristic to the attributes of the receiving townscape; and/or will result in partial loss, alteration or addition of key elements/features/characteristics.
Minor adverse townscape effect	The proposals will result in a small change in the key characteristics of townscape character; will introduce elements that are not uncharacteristic to the attributes of the receiving townscape; and/or will result in a minor loss, alteration or addition of elements/features/characteristics.
Negligible townscape effect	The proposals will result in a just discernible change to townscape character/elements/features/characteristics.
Negligible townscape benefit	The proposals will result in a just discernible improvement to the townscape character/elements/features/characteristics.
Minor townscape benefit	The proposals will achieve a degree of fit with the townscape character/elements/features/characteristics and go some way towards improving the condition or character of the townscape.
Moderate townscape benefit	The proposals will achieve a good fit with the townscape character/elements/features/characteristics, or would noticeably improve the condition or character of the townscape.
Major townscape benefit	The proposals will totally accord with the townscape character/elements/features/characteristics, or would restore, recreate or permanently benefit the condition or character of the townscape.
No Change	The proposals will not cause any change to the townscape character/ elements/ features/ characteristics.

12.36 The size and/or scale of change in the townscape takes into consideration the following factors:

- the extent/proportion of townscape elements lost or added;
- the contribution of that element to townscape character and the degree to which aesthetic/perceptual aspects are altered; and
- whether the effect is likely to change the key characteristics of the townscape, which are critical to its distinctive character.

12.37 The geographical extent of effects relates to:

- the area over which townscape effects are likely to be experienced, i.e. this could be at the site level, the immediate setting of the site, or townscape character type or area;
- the area over which visual effects are likely to be visible; and duration.

Visual receptors: Sensitivity of Receptor

12.38 In terms of assessing the baseline visual sensitivity, key factors to consider are the type of view and the likely numbers and types of viewers (the visual receptors). The type of view and the number of viewers are described in the following terms:

Glimpsed (i.e. in passing) / Filtered / Oblique / Framed / Open Views; and Few / Moderate / Many Viewers

The value attached to views has regard to a number of factors, including:

- recognition through planning designations or heritage assets; and
- the popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

12.39 The GLVIA identifies that the susceptibility of visual receptors to changes in views and visual amenity is a function of:

- The occupation or activity of people experiencing the view at a particular location; and
- The extent to which their attention or interest may therefore be focused on the views and visual amenity they experience at particular locations.

12.40 The assessment of receptor sensitivity is rated on the scale High-Medium-Low, and combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor, determined from the criteria below.

Table 12.4 Visual Receptor Susceptibility

Susceptibility	Type of Receptor
High	• Users of public space, including users of public rights of way, whose attention is likely to be focused on the townscape and on particular views; • Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience; • Communities where views contribute to the townscape setting enjoyed by residents; and • Travellers on scenic routes.

Susceptibility	Type of Receptor
Medium	- Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey; and - Users of public space, where the view is part of the wider experience of the place.
Low	- People at their place of work, where the setting is not important to the quality of working life; - Travellers on road, rail or other transport routes, where the view is fleeting and incidental to the journey; and - People engaged in outdoor sport or recreation, or users of a public space, which does not involve appreciation of views.

Table 12.5 Visual Receptor value

Value	Criteria
High	Views from townscapes/viewpoints of national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations. An example may be where the viewpoint features a nationally important designated asset as the main focus of the view.
Medium	Views from townscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations. The viewpoint may be a good location to view a designated asset of regional/ local importance, or where a nationally important designated asset is not the main focus of the view.
Low	Views from townscapes/viewpoints with limited designations, not particularly popular as a viewpoint and with minimal or no cultural associations. The viewpoint may include designated assets of regional/local importance which do not form the main focus of the view.

Visual: Magnitude of Effect

- 12.41 The magnitude of a visual effect is assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and degree of reversibility and will be rated within the range of Major-Moderate-Minor-Negligible-No Change set out below.

Table 12.6 Magnitude of visual effect

Category	Criteria
Major adverse or beneficial visual effect	The proposals will cause a dominant or complete change or contrast to the view, resulting from the loss or addition of substantial features in the view and will substantially alter the appreciation of the view.
Moderate adverse or beneficial visual effect	The proposals will cause a clearly noticeable change or contrast to the view, which would have some effect on the composition, resulting from the loss or addition of features in the view and will noticeably alter the appreciation of the view.
Minor adverse or beneficial visual effect	The proposals will cause a perceptible change or contrast to the view, but which would not materially affect the composition or the appreciation of the view.

Negligible adverse or beneficial visual effect	The proposals will cause a barely perceptible change or contrast to the view, which would not affect the composition or the appreciation of the view.
No change	The proposals will cause no change to the view.

- 12.42 The size or scale of change in the view relates to the degree of contrast or integration likely to result from the Proposed Development and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

Duration of Effect

- 12.43 Both Townscape and Visual effects may be experienced over a range of timescales. For this assessment, the following timescales are considered appropriate:

- Short-term: 1 year or below
- Medium-term: Between 1 and 10 years in duration
- Long-term: Greater than 10 years in duration

Significance of Effect

- 12.44 The objective of the assessment process is to identify and evaluate the likely significant effects arising from the Proposed Development for both Townscape and Visual Receptors. Significance indicates the importance or gravity of the effect. The table below, Table 12.7 is offered in support of professional judgement in determining the Significance of effect and is used as a guide to the narrative explanation of the nature and significance of both townscape and visual effects brought about by the Proposed Development.

Table 12.7: Significance of Effect

		Magnitude of Effect				
		Major Effect	Moderate Effect	Minor Effect	Negligible Effect	No Change
Sensitivity of Receptor	High	Major Significance	Moderate Significance	Moderate Significance	Minor Significance	No change
	Medium	Moderate Significance	Moderate Significance	Minor Significance	Negligible	No change
	Low	Moderate Significance	Minor Significance	Negligible	Negligible	No change

- 12.45 The effects on both townscape and visual receptors are examined in each case. All viewpoints have been subjected to the insertion of an Accurate Visual Representation (AVR) into a baseline

photograph so that the extent of both townscape and visual effects can be judged more accurately. In each case the effect of the Proposed Development is compared with the baseline condition or view and an assessment made in terms of receptor susceptibility, value of townscape setting or view, receptor sensitivity and magnitude of effect. A judgement is then made as to whether the effect is of major to negligible significance of effect using the Significance of Effect Matrix in **Table 12.7** and then a judgement made as to whether the effect is **significant** or **not significant** in EA regulation terms. For the purposes of this Townscape and Visual Impact Assessment, effects of **Moderate Significance** and above are considered to be **Significant**. Those values of Minor and below are therefore deemed to be **Not Significant**. A professional judgement is then made as to whether the effect is of an adverse or beneficial nature. The effects below are primarily concerned with the effects on townscape character and visual receptors.

- 12.46 This process has been applied to provide a robust assessment in similar townscape settings, including Crown Street Phases 1 and II, and is considered to be the most suitable approach in this context.
- 12.47 The visual impact of the Proposed Development will demonstrably change as it is constructed. As the construction phase is likely to be a relatively short period in the context of the lifecycle of the Proposed Development, the impact of the building upon completion, or operational phase, is the principal focus of this study although the construction effects are also examined below. Similarly, the impact pathway is direct. The building is either visible or it is not.

Mitigation Methodology

- 12.48 In terms of mitigation this has been incorporated into the design of the Proposed Development by the architects Simpson Haugh as the design of the building has developed, in consultation with interested parties. Mitigation for the Construction Phase Effects is described in the relevant section below.

Residual Impact Methodology

- 12.49 Residual Impacts are described based on the assumption that all mitigation measures have been fully deployed.

Baseline Conditions

Townscape Baseline

- 12.50 A summary set out below describes the main attributes and characteristics of each of the Townscape Zones and Representative Viewpoints that may be potentially affected by the Proposed Development as existing at the time of this assessment in April 2023. Each character area is referenced on Map 2 City Neighbourhood Areas and Viewpoint Locations (**Appendix 12.1**). Only those areas which have the potential to be significantly affected by the Proposed Development are included. For the purposes of this assessment, the baseline conditions that prevail at the current time (November 2022) in terms of townscape character and views are described below and include relevant schemes under construction, which are predicted to be complete when the Proposed Development is due to have been completed. The effects on the baseline together with the Proposed Development and any committed development is dealt with in the Cumulative Effects section.

Civic Quarter

- 12.51 Constituting the heart of the city, this zone includes many old but also new office buildings. It is criss-crossed by the Metrolink and by main bus and vehicular routes into and out of the city centre. At its core is Manchester Town Hall (Grade I Listed), now in the process of being restored, the spire of which is one of Manchester's most prominent skyline features, and Albert Square, an important civic space. Enclosed on all sides by buildings of similar scale and mass, trees have been introduced to soften the architecture and add to the ambience. Other important historic civic buildings include

the City Art Gallery (Grade II* Listed) and Central Library (Grade II* Listed). The latter a neo classical masterpiece by Vincent Harris and hemmed in by the neo-Gothic splendour of the Town Hall on one side and the Edwardian baroque red bricks of the Midland Hotel (Grade II Listed). The square is a major tram stop and contains the city's war memorial, which extends to form the Peace Garden at the back of the Town Hall.

Representative viewpoints 4,6

The Village

- 12.52 A generally compact area with a mix of leisure, commercial and residential uses, historic buildings and traditional grid street patterns predominate to the exclusion of the modern built form with the exception of Portland Tower and Manchester New Square. Although the building mass varies in scale and style, a predominantly narrow grid pattern of streets focusses potential views along axial corridors generally orientated in a NE / SW direction. The main spines in this zone are Canal Street alongside the Rochdale Canal and Whitworth Street. This busy pedestrianised street includes a mix of low-rise buildings converted to offices or bars, which together with the canal corridor provide a coherent, well-balanced visual character softened by tree planting. In the heart of the zone, the Sackville gardens fronting the Shena Simon Campus provide a welcome green space enclosed by the surrounding buildings.

Representative viewpoint 3

Spinningfields

- 12.53 The result of a major regeneration initiative which commenced in 1997 this area is now home to Manchester's financial community and restaurant scene. New development dominates and this is a vibrant busy district popular in equal measure both day and night. The area also includes the Crown and County Courts (Grade II Listed) and the cultural assets of the People's History Museum (Grade II Listed) and the newly refurbished John Rylands Library (Grade I listed). The area contains, Sunlight House (Grade II*), Masonic Lodge (Grade II). In addition, new apartment blocks have been constructed on the River Irwell frontage. Most of the building forms are large in scale and mass. The redevelopment has created several new and re-vamped public open spaces including Irwell Square, Hardman Square and Spinningfields Square, linked by a network of legible and pedestrian friendly routes. Views are varied depending on the orientation of the road junctions and the axial emphasis of the public open spaces but generally are few and far between.

Representative viewpoint 7

Petersfield

- 12.54 Several of the landmark buildings in this zone have been developed as high quality conference and leisure and facilities including Manchester Central, Bridgewater Hall and the Great Northern Warehouse (Grade II*). Squares and plazas exist alongside these facilities which include the open space enclosed by Manchester Central and the Midland Hotel, Barbirolli Square and the plaza in front of the Great Northern at the junction of Peter Street and Deansgate. These spaces, together with large buildings, provide an open, spacious quality to the area, which is in direct contrast to the narrow tightly knit street patterns that characterise much of the city centre. The varied forms of the buildings ranging from the angularity of the new Bridgewater Hall to the curve of the Manchester Central's roof contribute positively to the irregular and eclectic visual character of this zone. This has been further enhanced with the construction of the Beetham Tower (47 storeys), Manchester's highest building but now eclipsed by the Deansgate Square, and Axis developments.

Representative viewpoints 2,5,9,10 and 11

Castlefield

- 12.55 This zone forms Britain's first Urban Heritage Park and is one of Manchester's key tourist destinations. It is the terminus for the world's first industrial canal: the Bridgewater Canal and the

world's first passenger railway terminated nearby in 1830. Its historic interest is therefore very much linked with the historic transport networks formed by the railways and canals. It also includes the remaining sections of a Roman fort. In addition, the area provides a highly attractive location for offices, apartments, cafes, bars and hotel developments and includes public spaces and an events area. Castlefield Conservation Area covers this area.

- 12.56 The visual character of the area is varied. The many viaducts that pass through the zone provide the opportunity for panoramic views of the city but also visually enclose the spaces below. These strongly horizontal features contrast with the chimneys and towers all associated with the industrial development of the area. The historic fabric is well represented in Castlefield and the older buildings tend to assert themselves in defiance of more recent development.
- 12.57 The enclosed canal basins dominated by its restored heritage with an influx of new residential and leisure development are a particular characteristic feature of the zone. Here the public spaces and towpaths provide a very human scale and intimacy to the area. Throughout the canal system the views are constantly changing, even slight distances creating very different juxtapositions and views. The Mancunian Way passes through this area and links with the inner ring road affording occasional interrupted views of the City centre. Recent development includes the 20 storey development overlooking the basin, 2- 4 Chester Road.

Representative viewpoints 8,12,13 and 20

Water Street

- 12.58 A pocket of urban Manchester defined by transport connections which include the river Irwell, tram and railway lines, much of which is located on viaducts, and through which the inner ring road A57 runs. Recent development includes the tall building development of Water Street itself. Vacant land, earmarked for the Trinity Island development lies in this zone.

Representative viewpoint 14 and 15

First Street

- 12.59 This zone is the focus of a major scheme of regeneration in Manchester. Populated by a mixture of commercial, cultural and residential development it has become a busy and thriving area with many restaurants and bars and home to one of Manchester's newest theatres: Home. Student accommodation is also a feature of the many tall buildings which are located in this neighbourhood.

Representative viewpoint 1

Great Jackson Street

- 12.60 This zone has been transformed in recent years. The Site forms Part of Plot C, E and D of the Great Jackson Street Framework; a major part of the Southern Gateway redevelopment initiative situated on a key gateway into Manchester City Centre. The Development Framework was originally endorsed in 2007 and was updated in both 2015 and 2018. As a result of this initiative a major development of tall buildings has emerged in this townscape character area including Deansgate Square, Crown Street Phases 1 and 2. Plot F and G and others. A new school is also in the process of being constructed.

Hulme

- 12.61 This zone has also been subject to a considerable amount of regeneration in recent years and a large area of recent mostly low rise housing has emerged as a result. In addition, this zone contains one of the largest public open spaces close to the city centre: Hulme Park. The principal southern approach road: Princess Road cuts through this zone and although the road is sunken, the footbridges that cross over it offer some of the best views of central Manchester. The zone is predominantly residential.

Representative viewpoints 16,17 and 18.

Corridor Manchester

- 12.62 Embracing the area between Oxford Road and Cambridge Street as a main approach into Manchester City Centre this zone is characterised by its dense fabric of educational establishments focused on Manchester Metropolitan University but with elements of Manchester University and their associated teaching facilities and halls of residence. Liberty Living, a 34 storey tower, is a principal landmark in close proximity to Oxford Road station and the 32 storey tower on New Wakefield Street. A busy and bustling zone this is an area of constant activity. It also includes the Whitworth Street Conservation Area. The urban grain is orientated on a north west – south east axis and the multi building Circle Square development on the old BBC site has a significant impact on both townscape character and views.

Representative viewpoint 19

Embedded Mitigation

- 12.63 Mitigation in terms of visual and townscape effects has been incorporated into the Proposed Development as part of the design process by the scheme architects Simpson Haugh and has evolved through consultation with the Local Planning Authority and others.

Identification and Evaluation of Likely Significant Effects

Construction phases

- 12.64 The construction of the Proposed Development on a site on the centre of Manchester will clearly involve procedures and processes that are unsightly and intrusive consistent with operations on most large scale construction sites. However, this process is comparatively short lived in nature when considered in the context of the lifespan of the Proposed Development concerned and will also be screened to some extent by existing buildings which surround it. The demolition and construction programme will commence in a number of phases but the key physical activities will include:
- Site clearance and demolition
 - Construction plant such as cranes etc.
 - Mobile construction plant.
 - Delivery and stockpiling of materials.
 - Protective fencing and hoardings.
 - Unfinished appearance of the Proposed Development and its core for the majority of the construction period.
 - Traffic movements associated with the above.

Assessment of Construction Phase Effects- Townscape character

- 12.65 The construction phase effects, for all phases, as with the Operational Phase effects, are assessed against the Baseline. The townscape character area most affected by the demolition and construction operations are the Townscape Character Zones in and around the Proposed Development Site namely: Castlefield, Petersfield and Hulme however the surrounding tall buildings, with the exception of Plot D will do much to conceal the construction. The significance of effect is therefore predicted to be minor adverse for the duration of the construction period due to site clearance works, stockpiling of demolition and construction materials, the use of construction equipment such as cranes and temporary fencing. The effects, however, should be relatively

localised and temporary and will not affect other Townscape Character zones in any measurable way.

Effects of demolition, clearance and construction on Views

- 12.66 The effects of demolition and clearance on the Representative Viewpoints will also be limited by the effects of the surrounding tall buildings with the exception of views of Plot D from the south. Nonetheless, there is little doubt that the construction phase of any building of any scale, until it is fully clad, will involve processes that are visually unsightly and are likely, in visual effect terms, to be largely adverse in nature. This period, however, is only likely to be transitional and will be of short duration in relation to the lifespan of the Proposed Development itself. In view of the scale of the Proposed Development, the magnitude of effect, and significance of effect is therefore judged to be minor adverse during the construction period in the following Zones: Castlefield, Petersfield and Hulme where views can be obtained.

Operational phases

- 12.67 The source of the effect during the operation phase is concerned with the physical impact that the Proposed Development will have on views, visual and townscape receptors.
- 12.68 The townscape and visual effects of the Proposed Development are considered to be long term in terms of their duration.

These effects are now summarised with respect to the effects on townscape character and views through a narrative description of the nature of the effect on each of the Representative Viewpoints which lie within each character area.

Civic Quarter

Viewpoint 4 St Peter's Square

- 12.69 This viewpoint is located on the north eastern corner of the square where potential visibility is at its maximum. Townscape susceptibility, value and consequently sensitivity are judged to be high as this is also one of Manchester's key civic spaces with the Central Library, Midland Hotel and war memorial key buildings and monuments featured in this space and part of the St Peter's Square Conservation Area. Visual receptor sensitivity is medium with a number of receptors drawn from users of a public space where the view is part of the wider experience but mixed as many will be in transit either as pedestrians or as tram users. The viewpoint is of regional importance in terms of visual receptor value. Plot D is visible in this view but the 4 towers of Crown Street Phase 3 are not. Only the top of the tower is visible in this view and is manifestly a complementary item of this area of emerging townscape and visual character. In terms of magnitude of effect for both townscape and visual categories the effects are judged to be negligible beneficial. This translates to significance of effect values of minor beneficial for townscape receptors and negligible beneficial for visual receptors both of which are **not significant** in EA regulation terms.

Viewpoint 6 Albert Square

- 12.70 Closed temporarily for the refurbishment of the Town Hall, Albert Square remains nonetheless one of Manchester's most celebrated and iconic civic spaces. Townscape susceptibility and value are both high as the viewpoint is located within the Albert Square Conservation Area so townscape sensitivity is high. Similarly, visual receptor susceptibility and value are high as this is one of Manchester's key public spaces where the focus of attention and views are an important part of the experience. Visual Receptor sensitivity is high therefore. Only Plot D is visible from this viewpoint but will be rapidly eclipsed by Viadux which is emerging in the foreground. In terms of magnitude of effect therefore, the effects are judged to be negligible beneficial which translates into significance of effect values of minor beneficial both of which are **not significant** in EA regulation terms.

The Village

Viewpoint 3 Princess Street

- 12.71 Located on the busy intersection between Portland Street and Princess Street the Deansgate Square development is a key feature of the horizon. Townscape susceptibility and value are both judged to be low here in the absence of any formal designations. Townscape sensitivity is judged to be low. This area is also populated by a number of hotels where visual receptors are drawn from transient categories where the view is incidental to their experience. Visual receptor sensitivity is also low. Both Plot D and Phase 3 are visible in this view with Plot D matching the height of the tallest components of Deansgate Square. As such they form a consistent part of the townscape character merging seamlessly with the tall building cluster in this location in a beneficial way that adds visual interest. As a consequence, the magnitude of effect values, for both townscape and visual receptors, are judged to be minor beneficial which translates to significance of effect values of negligible beneficial which is **not significant** in EA regulation terms.

Spinningfields

Viewpoint 7 Deansgate

- 12.72 Located at the busy intersection between Deansgate and Quay Street this viewpoint offers a close up view of the Proposed Development. In townscape susceptibility terms the listed Victorian terrace façade to Deansgate is very prominent but recent development has emerged to add depth and new forms to the character of the townscape here. This includes Beetham tower, constructed in 2004 and the more recent Deansgate Square and emerging Viadux developments. In terms of townscape susceptibility therefore a value of medium is registered for this viewpoint. Townscape value is high as the viewpoint lies within the Deansgate Conservation Area inferring that townscape sensitivity is medium high overall. Visual receptor susceptibility is low as this is a busy intersection with most receptor categories in transit. The view however, is heavily influenced by listed buildings so visual receptor value is high as a result so visual receptor sensitivity is medium overall. All component parts of the Proposed Development are visible here: Plot D and 3 of the 4 towers of Crown Street Phase 3. They merge into a continuous façade but the height of Plot enhances the composition and visual interest is increased as a result. In the context of Deansgate Square and Beetham Hilton, magnitude of effect is judged to be minor beneficial for both categories of receptor which translates to significance of effect values of minor beneficial which is **not significant** in EA regulation terms.

Petersfield

Viewpoint 2 Whitworth Street West

- 12.73 This area has seen much change in recent years including the Deansgate Square development which is the focus of this view on the horizon. Townscape susceptibility is low in this context and as the viewpoint lies outside any conservation area townscape value is equally low. Townscape sensitivity is low therefore. In terms of visual receptors, categories are mixed from travellers on foot and vehicle at street level to the occupants of the high rise residential blocks that line the street. Visual receptor sensitivity is therefore judged to be medium overall. Both Plot D and Crown Street Phase 3 Towers are visible here and they consolidate the Deansgate Square tall building cluster blending seamlessly with it in the process. Values of negligible beneficial are registered for both categories of receptor for this viewpoint which translates into negligible beneficial significance which is **not significant** in EA regulation terms.

Viewpoint 5 Lower Moseley Street

- 12.74 Located just outside the Midland Hotel the view is panoramic in nature and is a good illustration of the way in which recent development is shaping the townscape character of central Manchester. Manifest in the forms of Deansgate Square, Beetham Tower, Axis and, most recently Viadux, towers the latter of which is in the process of construction, these tall buildings are making a dramatic contribution to this view and altering the baseline in a significant way. As such, townscape

susceptibility is judged to be low but townscape value is high in the context of the public open space and the presence of two key listed buildings inferring that townscape sensitivity is medium overall. Most visual receptors are from transit categories drawn to and from the bulk of the buildings ranging from hotels, conference venues to concert halls. Visual receptor value is medium however, as two of central Manchester's key buildings: Manchester Central and the Midland Hotel occupy pivotal positions in the view enclosing a small area of public open space. Visual receptor sensitivity is judged to be medium overall. In terms of magnitude of effect both Plot D and one tower of Crown Street Phase 3 are visible here but only in a marginal way. Values of negligible beneficial significance are registered for both townscape and visual receptor categories which translates into negligible beneficial significance overall which is **not significant** in EA regulation terms.

Viewpoint 9 Deansgate

- 12.75 In townscape receptor sensitivity terms this viewpoint lies on the edge of the Castlefield Conservation Area, townscape value is judged to be high as a consequence. The historical context at street level is strong here with the historic 1877 railway viaduct crossing above Deansgate and contributes to a value of medium townscape sensitivity for this viewpoint. Visual receptor sensitivity is variable, high in the numerous residential properties characteristic of this area, low for users of the Chester Road, and medium overall. The results of the Great Jackson Street SRF are plain to see in this viewpoint in which the baseline has changed so radically in recent years. All major components of Crown Street Phase 3 and Plot D are visible here as the tall building cluster is consolidated. The fit is good and complimentary and the crenelated façade detail of the Crown Street Phase 3 towers clearly visible and providing additional visual interest. Overall magnitude of effects values of minor beneficial are recorded here which translates to significance of effect values of minor beneficial which is **not significant** in EA regulation terms.

Viewpoint 10 Deansgate

- 12.76 A similar view at the intersection with Deansgate and Whitworth Street at the bottom of the stairs to Deansgate station. The adjacent Castlefield Congregational Chapel, to the north of the road and the network of Grade II listed viaducts and bridges in the foreground, are all key historical assets in the view. This viewpoint also lies close to the Castlefield Conservation Area. Townscape sensitivity is judged to be medium as a consequence but visual receptor sensitivity low as most receptors are in transit and the view is fleeting and incidental to the journey. All major components of Crown Street Phase 3 and Plot D are visible here as the tall building cluster is consolidated accordingly. The crenelated façade of the 4 Crown Street towers is more apparent in this view and distinguishes the Proposed Development from the baseline development of Deansgate Square successfully. Allowing for the fact that the Proposed Development is, for the most part, visible as a background element that fits consistently with the baseline character, magnitude of effect values of minor beneficial are registered for both categories here. This translates into significance of effect values of minor beneficial which is **not significant** in EA regulation terms.

Viewpoint 11 Deansgate Tram Station

- 12.77 This viewpoint is located on the upper stairwell platform from Deansgate Castlefield to Deansgate stations above Whitworth St West. It offers an excellent elevated open, middle distance view of the Great Jackson Street framework. It allows the Proposed Development to be placed in context across a broad urban horizon dominated by tall buildings such as Deansgate Square in the foreground. Townscape sensitivity is higher here than in most areas of Manchester due the concentration of historic assets and the fact that the area to the north of Chester Road has been designated a Conservation Area. A value of medium is therefore ascribed to this viewpoint. Visual receptor sensitivity is low, however, as receptors are likely to be travellers where views are fleeting and incidental to their journey. Once again, the principal component parts of the Proposed Development, which include Crown Street Phase 3 and Crown Street Plot D, appear largely as background elements behind the foreground towers of Deansgate Square. Magnitude of effect values of minor beneficial are recorded here for both receptor categories which translates into

minor beneficial for townscape receptors and negligible beneficial for visual receptors in terms of significance of effect values both of which are **not significant** in EA regulation terms.

Castlefield

Viewpoint 8 Mamucium

- 12.78 Home to Mamcumium, Roman fort the remains of which are still present, this small green space is now part of Castlefield Urban Heritage Park and is within Castlefield Conservation Area. Beetham Hilton dominates the view and is now an established feature of the townscape conferring a townscape susceptibility value of medium. Townscape value is high so townscape sensitivity is medium high. Visual receptor sensitivity is high also as visual receptors are drawn from the highest category and townscape value is high for heritage attraction reasons. The Proposed Development effectively fills the gap between the Deansgate Square development and Crown Street Phases I and II. Plot D lifts the profile of this elevation view successfully and adds visual interest to the horizon. Similarly, the crenulated façade of the four Crown Street Phase 3 towers helps to distinguish them from their neighbours. For these reasons the magnitude of effect value is judged to be moderate beneficial for both receptor categories which translates to moderate beneficial significance of effect which is **significant** in EA regulation terms.

Viewpoint 12 Castlefield Basin

- 12.79 Castlefield basin sits within Castlefield Conservation Area and Castlefield Urban Heritage Park and has a strong sense of townscape character derived for the most part by its large collection of historic buildings and features such as the Bridgewater canal. However, in recent years the emergence of a cluster of tall buildings in close proximity to Castlefield basin such as Deansgate Square, Crown Street Phase 1 and 2, 2 – 4 Chester Rd and Viadux has changed the townscape and visual baseline to a significant degree. Townscape sensitivity is therefore judged to be medium as a result. Visual receptor sensitivity is medium also in this quiet basin where the focus of the view remains within the confines of the enclosed townscape and where the focus remains on quiet enjoyment of the surroundings which are of high quality and value. All the principal components of the Proposed Development are visible in this view and the 4 towers of Crown Street Phase 3 fill the void successfully between Deansgate Square and Crown Street Phases 1 and 2 such that the composition as a whole becomes more visually coherent. Magnitude of effect is judged to be moderate beneficial as a result for both receptor categories which translates to a significance of effect values of moderate beneficial also which is **significant** in EA regulation terms.

Viewpoint 13 A56 Interchange

- 12.80 Located at the traffic interchange between the Mancunian Way and the A56 Chester Road, this viewpoint offers a niche view into central Manchester. New development has made a significant contribution to a changing townscape with Beetham Hilton, 2- 4 Chester Road and Crown Street all present in this view. Townscape susceptibility is low as a result as is townscape value as the location is outside the Castlefield Conservation Area. Townscape sensitivity is therefore judged to be low. Visual receptor sensitivity is low also as most receptors are in transit and visual receptor value is low. Only 2 towers of Crown Street Phase 3 are visible in the view. They are set back from the main A56 road and consolidate the gateway effect established by the existing tower cluster at this point. The magnitude of effect values for both receptor categories is judged to be minor beneficial which translates to negligible beneficial significance of effect which is **not significant** in EA regulation terms.

Viewpoint 20 A56

- 12.81 This viewpoint explores a more distant view which sets the Proposed Development in the context of the Great Jackson Street framework along one of the principal approach roads into Manchester: the A56 Chester Road. Emerging tall development which is now part of the baseline is strongly evident in this view. It includes the towers of Axis, Deansgate Square and the emerging Crown Street Phase 2 towers on the east side of Chester Road and the recently completed Trilogy development in the

foreground to the west. The view is more balanced and softened by trees and the tall buildings are making a significant and positive contribution to the townscape character by increasing visual and townscape interest. As a result, townscape sensitivity is judged to be medium. Visual receptor sensitivity is mixed, raised to high by the emerging residential development but generally low at pavement level in the context of this busy approach route, so medium overall. Most of the component parts of Crown Street Phase 3 are visible from this viewpoint and the cluster of towers is very much consolidated as a result with Plot D adding more height and increasing visual interest as a result. The magnitude of effect values for both receptor categories is judged to be minor beneficial which translates to minor beneficial significance of effect which is **not significant** in EA regulation terms.

Water Street

Viewpoint 14 Regent Road

- 12.82 Located at traffic interchange between the Trinity Way, or the Inner Ring Road and the A57, this viewpoint offers a panoramic view of the skyline of central Manchester. Beetham Hilton is the notable landmark in this view along with Viadux which is emerging alongside. Townscape susceptibility is low as is townscape value at this location. Townscape sensitivity is therefore judged to be low. Visual receptor sensitivity is low also as most receptors are in transit and visual receptor value is also low. Crown Street Phase 3 Plot D rises behind Crown Street Phase 3 and provides a new focal point in this cluster of tall buildings improving the visual composition and filling the void created by Deansgate Square and Crown Street Phases 1 and 2 successfully. Magnitude of effect values for both receptor categories is judged to be minor beneficial which translates to negligible beneficial significance of effect which is **not significant** in EA regulation terms.

Viewpoint 15 Trinity Way

- 12.83 A view taken to demonstrate the long distance effects of the Proposed Development on the emerging skyline of Manchester from one of the city's busiest routes: Trinity Way or the Inner Ring Road. Beetham tower and the Great Jackson Street framework tall buildings such as Deansgate Square and Crown Street Phases 1 and 2 are now all notable tall buildings which are part of the baseline. Visual receptor sensitivity is mixed here, high associated with the residential apartments of Wilburn Street close by and low at ground level as this a major and constantly busy road so medium overall. Townscape sensitivity is low and with a good capacity to accommodate change. Plot D rises behind Crown Street Phase 3 and has a similar effect to viewpoint 14 by providing a new high focal point in the composition which is improved as a result. The void between the various phases of development on this Site is filled and visual tension resolved as a result. Magnitude of effect values for both receptor categories is judged to be minor beneficial which translates to negligible beneficial significance of effect for townscape receptors and minor beneficial for visual receptors both of which are **not significant** in EA regulation terms

First Street

Viewpoint 1 Home Square

- 12.84 This viewpoint is situated on a major access road into Central Manchester, Medlock Street. Development activity in this zone has been considerable in recent years and is ongoing as the emerging Viadux development testifies. Townscape susceptibility is low as a result and as this viewpoint lies outside a conservation area townscape value is low also. Townscape sensitivity is therefore low. This is primarily a commercial, rather than a residential, district at present with a mixture of offices and shops. Most visual receptors are either at their place of work or in transit. Visual receptor sensitivity is judged to be low therefore. The Deansgate Square dominates the view here and the Proposed Development fits seamlessly and almost imperceptibly. Magnitude of effect is judged to be negligible beneficial as a result for both categories which translates into negligible significance of effect for both receptor categories which is **not significant** in EA regulation terms.

Hulme

Viewpoint 16 St George's Park

- 12.85 Located in the centre of Hulme, St Georges Park is a valuable area of local green space. Low rise housing defines the edge of the park but some high rise blocks are also a feature of the view. Mature trees soften the edges and reinforce the character of this quiet recreational space. As a result, townscape sensitivity is judged to be medium for the immediate curtilage to the park but decreasing in the areas beyond and clearly is of local value despite not being designated in any formal way. Visual receptor sensitivity is medium also as the area is residential and receptors will also be drawn from users of a public space where the view is part of the local experience. The Proposed Development falls within the visual envelope of the Great Jackson Street framework cluster with Crown Street Plot D providing addition height to the composition. The tall building cluster is consolidated as a result and improved through a further differentiation in form and style intrinsic to the component parts of Crown Street Phase 3. Magnitude of effect is judged to be minor beneficial in this instance for both receptor categories which translates into a minor beneficial significance of effect which is **not significant** in EA regulation terms.

Viewpoint 17 Wilfrid's Park

- 12.86 This viewpoint is located in a small pocket park or green space within the residential district of Hulme. Housing encloses the park on all sides but the Great Jackson Street framework buildings populate the horizon notably Deansgate Square and Crown Street Phases 1 and 2. Townscape susceptibility is low as a result in this context and townscape value is low also as the space is small and of local importance. Townscape sensitivity is therefore low for this viewpoint. Visual receptor sensitivity is higher however, a function of the fact that most receptors will be occupiers of residential dwellings or users of this pocket park. Visual receptor value is high also as this is a valuable well used green space in the centre of Hulme. Visual receptor sensitivity is therefore judged to be high as it is a densely built up residential neighbourhood. Plot D has the most significant effect here rising up well above its neighbours. Visual composition and townscape character is improved as the stepped profile that results increases visual interest and the horizon becomes more variable. Magnitude of effect is judged to be minor beneficial which translates to minor beneficial for townscape receptors and moderate beneficial for visual receptors which is **not significant** and **significant** respectively.

Viewpoint 18 Hulme Park

- 12.87 Hulme Park is an open green space south of the city centre deep in the heart of Hulme. Because of its wide and open aspect it offers views of the city centre skyline above a ring of enclosing trees. This viewpoint was selected in towards the edge of the park avoiding Deansgate square towers which have now become the dominant visual influence. Receptor sensitivity is judged to be low here in the context of the Great Jackson Street SRF which has driven so much townscape change. Townscape susceptibility and sensitivity and is low as a result. The park is the largest park in Hulme and, as such, is a valuable green space of district value. Visual receptor sensitivity is judged to be medium as the view is part of the experience but not focussed on a feature of special significance. Four component parts of the Proposed Development are clearly visible here and fill the gap between Crown Street Phases 1 and 2 and Deansgate Square. The relationship between the 4 towers of Crown Street Phase 3 is plain to see and the crenulated façade helps to distinguish them from their neighbours. Plot D rises high and provides new vertical interest. In the context of distance from receptor the magnitude of effect is judged to be moderate beneficial for both receptor categories. This translates into significance of effect values of minor beneficial for townscape receptors and moderate beneficial for visual receptors which are **not significant** and **significant** accordingly.

Corridor Manchester

Viewpoint 19 Hulme Arch Bridge

- 12.88 The Stretford Road crosses Princess Road at this point on a bridge which affords panoramic views of the city centre at an open point in the urban fabric of Hulme. Beetham Hilton forms a notable landmark on the horizon along with Deansgate Square and River Street which can all be clearly seen. Townscape sensitivity is judged to be low here as this area has been the subject of much regeneration in recent years, which has increased its capacity to absorb change. Although it is a residential area the presence of Princess Road as a busy route and lack of any formal conservation designation reduces its sensitivity. Visual receptor sensitivity is therefore judged to be low also. The existing tall buildings of the Great Jackson Street framework already have a considerable presence in this view. The addition of all the components of the Crown Street Phase 3 including Plot D build on this and widens the visual envelope effectively. Magnitude of effect for both categories is judged to be minor beneficial which translates into significance of effect values of negligible beneficial for both receptor categories also which is **not significant** in EA regulation terms.

Assessment of Cumulative Effects

- 12.89 The cumulative effect of the Proposed EIA Development is now examined in relation to intra-project and inter-project cumulative effects.

Inter-project cumulative effects

- 12.90 In terms of inter- project cumulative effects, or effects arising from similar developments that are either consented or are coming forward in the planning process in close proximity to the Proposed EIA Development Site, there are developments that, cumulatively, are considered to affect the significance values for townscape and views. Table 6.9 summarises these schemes. Details of the Cumulative schemes are outlined in the ES Appendices and appear as different coloured wirelines in the AVRs in Appendix 12.2.

Table 12.9 Cumulative schemes

Planning reference	Cumulative Scheme	No of storeys / Ht
111003/FO/2016/C1	10-12 Whitworth St	35 Storeys
129273/FO/2021	Gt Jackson St Plot G	56 Storeys
129406/FO/2021	Gt Jackson St Plot H	28 Storeys
129406/FO/2021	Deansgate South	28 Storeys
132199/FO/2021	Gt Jackson St Plot F	51 Storeys
125804/FO/2019	325,327 Deansgate.	22 Storeys

- 12.91 First Street Plot 11 has started construction on site but it will have no material effect on any of the Representative viewpoints as it is some distance away from the Proposed Development site and reinforces the townscape character of the First Street character area.
- 12.92 The developments listed above will not have a universal effect on all of the selected viewpoints and the townscape character of the affected city centre zones of Salford and Manchester. The baseline schemes have already been assessed under the Operational Effects section earlier in this chapter. An assessment of cumulative schemes is necessary to understand the manner in which the Proposed Development fits in with neighbouring developments in the future. **Table 12.10**, has been compiled to facilitate this process by first summarising the effect of the Proposed Development on its own, using the values resulting from the Operational Effects section, and then reassessed the effect in respect of the relevant committed cumulative scheme on a viewpoint by viewpoint basis. Where a cumulative scheme is predicted to have an effect on views or townscape character then

the significance of effect values are reassessed and adjusted accordingly to take the scheme or schemes into account in each case.

- 12.93 The relevant cumulative schemes have been modelled and are represented as different coloured wirelines in the Cumulative Views in **Appendix 12.2** Viewpoint and townscape photographs including AVR images.
- 12.94 Of course, as the cumulative schemes come forward then, in certain cases, visual receptor sensitivity is likely to increase as many of the developments contain apartments. However, by the same token, the magnitude of effect is likely to decline as the Proposed EIA Development will now be seen in the context of a greater number of similar developments of equivalent scale. As a result, the net effect, where the effect is deemed to be significant, is generally a lowering of the significance of effect value in cumulative terms. This is exacerbated to a value of not significant if the cumulative building obscures the view of the Proposed EIA Development completely which occurs in a few cases

Table 12.10 TVIA Committed Cumulative Schemes Impact Assessment summary table

(Note. Where townscape (T) and visual receptor (VR) significance of effect values are the same, one shared value is provided. Where they are different, a value is provided for both categories. Abbreviations: Maj = Major ;Mod = Moderate; Min = Minor ; Neg = Negligible;

Location	Development Only (Residual Impact)	EIA significance	Relevant Cumulative Scheme	Cumulative Effect
1 Home Square Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Low Low Neg Beneficial Neg Beneficial Neg Beneficial	Not significant	Plot F Gt Jackson St Plot G	Neg Beneficial
2 Whitworth Street West Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Medium Low Neg Beneficial Neg Beneficial Neg Beneficial	Not significant	Plot F Gt Jackson St Plot G	Neg Beneficial
3 Princess Street Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Low Low Min Beneficial Min Beneficial Neg Beneficial	Not significant	Plot F Gt Jackson St Plot G	Neg Beneficial
4 St Peter's Square				

Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect (T) Significance of effect (VR)	Medium High Neg Beneficial Neg Beneficial Min Beneficial Neg Beneficial	Not significant	Plot F Gt Jackson St Plot G Whitworth St	Neg Beneficial
5 Lower Moseley Street	Medium Medium Neg Beneficial Neg Beneficial Neg Beneficial	Not significant	Plot F Gt Jackson St Plot G Whitworth St	Neg Beneficial
6 Albert Square	High High Neg Beneficial Neg Beneficial Min Beneficial	Not significant	Gt Jackson St Plot G Whitworth St	Neg Beneficial
7 Deansgate	Medium Medium/High Min Beneficial Min Beneficial Min Beneficial	Not significant	Plot F Gt Jackson St Plot G 325,327 Deansgate.	Neg Beneficial
8 Mamucium	High Medium/High Mod Beneficial Mod Beneficial Mod Beneficial	Significant	Gt Jackson St Plot G Deansgate south	Mod beneficial
9 Deansgate	Medium Medium		325,327 Deansgate. Deansgate south	

Magnitude (VR) Magnitude (T) Significance of effect	Min Beneficial Min Beneficial Min Beneficial	Not significant		Neg Beneficial
10 Deansgate Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Low Medium Min Beneficial Min Beneficial Min Beneficial	Not significant	Deansgate south Plot F	Min beneficial
11 Deansgate Tram Station Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect (T) Significance of effect (VR)	Low Medium Min Beneficial Min Beneficial Min Beneficial Neg Beneficial	Not significant	Deansgate south Plot F	Neg Beneficial
12 Castlefield Basin Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Medium Medium Mod Beneficial Mod Beneficial Mod Beneficial	Significant	Deansgate south Plot F Great Jackson St Plot G	Mod beneficial
13 A56 Interchange Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Low Low Min Beneficial Min Beneficial Neg Beneficial	Not Significant	None	None
14 Regent Road Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T)	Low Low Min Beneficial Min Beneficial		Plot F Great Jackson St Plot G Arundel St	

Significance of effect	Min Beneficial	Not significant		Min beneficial
15 Trinity Way Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect (T) Significance of effect (VR)	Med Low Min Beneficial Min Beneficial Neg Beneficial Min Beneficial	 Not significant	Plot F Great Jackson St Plot G Deansgate south Arundel St Trinity Islands	 None
16 St George's Park Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Medium Medium Min Beneficial Min Beneficial Min Beneficial	 Not significant	Plot F Great Jackson St Plot G	 Neg beneficial
17 Wilfrid's Park Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect (T) Significance of effect (VR)	High Low Min Beneficial Min Beneficial Min Beneficial Mod beneficial	 Not significant Significant	Plot F Great Jackson St Plot G	 Min beneficial
18 Hulme Park Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect (VR) Significance of effect (T)	Medium Low Mod Beneficial Mod Beneficial Mod Beneficial Min Beneficial	 Significant Not significant	Plot F Great Jackson St Plot G	 Min beneficial
19 Hulme Arch Bridge Sensitivity (VR) Sensitivity (T)	Low Low Min Beneficial		Plot F Great Jackson St Plot G	

Magnitude (VR) Magnitude (T) Significance of effect	Min Beneficial Neg Beneficial	Not significant		Neg Beneficial
20 A56				
Sensitivity (VR) Sensitivity (T) Magnitude (VR) Magnitude (T) Significance of effect	Medium Medium Min Beneficial Min Beneficial Min Beneficial	Not significant	Great Jackson St Plot G Whitworth st Deansgate south	Neg Beneficial

Mitigation Measures

Mitigation of effects during the construction phase.

- 12.95 Mitigating the effects of the construction phase will involve high quality hoardings that will be used to limit unsightly visual impacts during the construction phase at street level. These will secure and protect the Proposed Development Site and prevent views of an unsightly construction site.

Mitigation of effects during operational phase

- 12.96 Mitigation measures for the operational phase are focussed on embedded mitigation measures which are an integral part of the design of the building, as progressed by architects Simpson Haugh and fully described in the Design and Access Statement which accompanies the planning application. These mitigation measures deal with the Proposed Development's relationship to the site's heritage, the establishment of a sense of place derived from a unitized approach to the design of the scheme and the use of materials and features which sit comfortably with the surrounding neighbourhood.

Residual Effects

- 12.97 The visual impact assessment has been carried out based on the assumption that all the necessary mitigation measures have been accounted for in the design process. The images for selected viewpoints illustrated in **Appendix 12.2** represent the accurate definition of the location and mass of the component parts of the Proposed EIA Development. The predicted significance of effect values are therefore the same for each representative viewpoint and Townscape Character Area as the residual effect values and are illustrated in **Table 12.10** above.

References

Ref . No.	Reference
12.1	The European Landscape Convention (ELC, 2000)
12.2	National Planning Policy Framework 2021 Dept Communities and Local Government
12.3	Manchester City Council Core Strategy 2012
12.4	Manchester Residential Quality Guidance MCC 2017
12.5	Guidelines for Landscape and Visual Impact Assessment 3 rd Edition 2013 landscape Institute and Institute of Environmental Management and Assessment

12.6	Historic England note on tall buildings 2022
12.7	Landscape Institute Technical Guidance Note 06/19 September 2019,Landscape Institute

13. Traffic and Transport

Introduction

- 13.1. This Chapter of the ES has been prepared by Curtins and assesses the likely traffic and transport impacts of the proposals upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures if required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.
- 13.2. This Chapter is accompanied by two technical appendices, a Transport Assessment (TA) (Appendix 13.1) and Framework Travel Plan (TP) (Appendix 13.2). These reports have informed the Traffic and Transport Chapter of this ES.
- 13.3. The author of this Chapter – Carl Peers of Curtins – has relevant experience in preparing Traffic and Transport Chapters for EIA developments. Carl is a Business Unit Director at Curtins responsible for the northern transport planning teams in England. He has over 18 years' experience in development planning, managing projects at all stages of the planning process from initial development feasibility to detailed planning submission and the discharge of planning conditions. He prepares Transport Assessments, Travel Plans and transport chapters of ES reports as part of the EIA process.

Assumptions and Limitations

- 13.4. Traffic surveys have been undertaken at the A56/Great Jackson Street priority junction; the A56/A5067/A57(M) Deansgate Interchange signalised roundabout and the City Road East/Medlock Street priority junction in November 2022.
- 13.5. At the time of the surveys and at present, Melbourne Street is closed at its southern end and does not currently permit vehicular movement to/from the A57 Mancunian Way due to ongoing construction works associated with Crown Street Phase 2 (CSP2). On this basis, base flows for the 2028 future year have been extracted from the CSP2 development (Manchester City Council (MCC) Reference: 126668/FO/2020) to establish an appropriate and suitable baseline position on Melbourne Street.
- 13.6. These flows have been sense-checked and Curtins assumes these vehicle flows are accurate.
- 13.7. The Baseline scenario comprises 2022 flows (and extracted 2028 flows for Melbourne Street) without traffic growth but inclusive of all relevant Committed Development flows. This is in line with other recently approved City Centre developments and is also in line with the targeted reduction in peak hour trips to the city centre outlined within the Transport for Greater Manchester (TfGM) City Centre Transport Strategy to 2040.
- 13.8. Junction capacity assessments will be undertaken using the industry-standard junction modelling software packages JUNCTIONS and LinSig. Further details are provided within the accompanying TA (Appendix 13.1). There are various inputs to these models, such as geometric measurements and traffic data, as well as assumptions about driver behaviour. However, when used correctly, these programs provide an accurate reflection of junction capacities, queueing and delay.
- 13.9. Annual Average Daily Traffic (AADT) and Annual Average Weekday Traffic (AAWT) factors have been calculated from peak hour flows and there are both limitations and assumptions associated with factoring traffic counts from peak hours to 24-hour AADT and 18-hour AAWT flows. Notwithstanding, this is common practice, and the factors provide a means of deriving and comparing daily traffic flows in the study area.

Legislative and Policy Context, Guidance

- 13.10. Relevant sections of the following key transport policy documents are to be taken account in the preparation of the Traffic and Transport Chapter of the ES:
- National Planning Policy Framework (MHCLG, 2021);

- Planning Practice Guidance (DLUHC/MHCLG, 2014);
- Manchester Core Strategy (2012 – 2027) (MCC, 2012); and
- Greater Manchester Transport Strategy 2040 (TfGM, 2021).

13.11. Additionally, the key guidance documents that are relevant to the assessment and have been considered are set out below:

- Great Jackson Street Development Framework (MCC, 2018);
- Manchester Residential Quality Guidance (MCC, 2016);
- Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993);
- Institute of Environmental Management and Assessment;
- Guidelines for Providing for Journeys on Foot (CIHT, 2000);
- The National Model Design Code (DLUHC/MHCLG, 2021);
- Buses in Urban Developments (CIHT, 2018);
- Manual for Streets 1 & 2 (DfT, 2007 and CIHT, 2010 respectively);
- Design Manual for Roads and Bridges (NH, Various Dates); and
- Transport Analysis Guidance (TAG) (DfT, Various Dates).

13.12. The above policy and guidance documents have been taken into account in the preparation of this Chapter of the ES and the accompanying TA and FTP.

Assessment Methodology and Significance Criteria

13.13. The assessment methodology consists of the following key stages:

- Establishment of baseline conditions;
- Assessment of demolition and construction effects;
- Assessment of operational effects; and
- Assessment of residual and cumulative effects.

13.14. The extent of the study area has been defined using a combination of Institute of Environmental Management and Assessment (IEMA) Guidelines and the extent of the network being considered as part of the TA. Locations on the highway network surrounding the Site have been identified and assessed in terms of the potential impact of the Proposed Development relative to baseline traffic flows, considering the potential for both arriving and departing vehicles at the Site.

13.15. The environmental impacts of traffic generated by the Proposed Development have been assessed in line with the criteria set out within the IEMA Guidelines, which provide two broad rules to define the need for an environmental impact assessment:

- Highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); and
- Any other specifically sensitive areas where traffic flows have increased by 10% or more.

13.16. These thresholds have been used to identify the links and junctions where an assessment of the potential impacts of the Proposed Development on driver delay, public transport users, pedestrian delay and amenity, fear and intimidation, severance, and collisions and road safety is required.

13.17. In accordance with the IEMA Guidelines, the impact of traffic is dependent upon a wide range of factors, including:

- Volume of traffic;
- Traffic speeds and operational characteristics; and

- Traffic composition (e.g., percentage of HGVs).

- 13.18. An assessment of 'hazardous loads' has not been undertaken as it is not anticipated that the construction process would require carriage of material listed in 'The Carriage of Dangerous Goods in the UK'. If these materials become needed during the course of construction, the legal requirements associated with their transit would be strictly enforced.
- 13.19. The assessment methodology for each potential impact is set out below.

Driver Delay

- 13.20. The accompanying TA (Appendix 13.1) includes junction capacity assessments for the study area using the industry standard software package – JUNCTIONS and LinSig. These programs give output ratios of flow to capacity (RFC) / degrees of saturation (DoS), queue lengths and delays, which give an indication of the overall operational capacity and performance of the junctions.
- 13.21. Changes in delay to drivers have been considered with reference to the delay statistics from the junction capacity assessments. This has been used to inform the criteria for determining the impact of the Proposed Development on driver delay, as set out in Table 13.1.

Table 13.1 – Driver Delay Thresholds

Magnitude of Change (Impact)	Threshold
Major	Over 2 minute change in driver delay
Moderate	1–2 minute change in driver delay
Minor	30 second to 1 minute change in driver delay
Negligible	Less than 30 second change in driver delay
No Change	No perceptible change in driver delay

Public Transport Users

- 13.22. The potential impacts on road-based public transport (bus) users in the vicinity of the Site have been assessed in a similar way to driver delay. The increase in delays have been calculated based on the junction capacity assessment results for junctions that key bus services pass through in the study area.
- 13.23. Changes in delay to public transport users have been considered with reference to the delay statistics from the junction capacity assessments. This has been used to inform the criteria for determining the impact of the Proposed Development on public transport users, as set out in Table 13.2.

Table 13.2 – Public Transport Delay Thresholds

Magnitude of Change (Impact)	Threshold
Major	Over 2 minute change in delay at junctions along bus routes
Moderate	1-2 minute change in delay at junctions along bus routes
Minor	30 second to 1 minute change in delay at junctions along bus routes
Negligible	Less than 30 second change in delay at junctions along bus routes

Magnitude of Change (Impact)	Threshold
No Change	No perceptible change in delay at junctions along bus routes

Pedestrian Delay

- 13.24. A change in vehicular demand affects the ability of pedestrians to cross local routes, which results in an impact on delay and on an individual's desire to make a particular walking journey.
- 13.25. The Guidelines for the Environmental Assessment of Road Traffic indicate that a 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour. This has been used to inform the criteria for determining the impact of the Proposed Development on pedestrian delay, as set out in Table 13.3.

Table 13.3 – Pedestrian Delay Thresholds

Magnitude of Change (Impact)	Threshold
Major	Over 40 second change in pedestrian delay
Moderate	30-40 second change in pedestrian delay
Minor	20-30 second change in pedestrian delay
Negligible	Less than 20 second change in pedestrian delay
No Change	No perceptible change in pedestrian delay

Pedestrian Amenity

- 13.26. Pedestrian amenity can be described as the relative pleasantness of a journey and an individual's desire to make that particular walking journey. Changes in the volume, speed or composition of traffic and the physical condition at crossing points affect pedestrian amenity.
- 13.27. The Guidelines for the Assessment of Environmental Impact of Road Traffic refers to a threshold for judging the significance of changes in pedestrian amenity where the traffic flow, or the HGV component, doubles. This has been used to inform the criteria for determining the impact of the Proposed Development on pedestrian amenity, as set out in Table 13.4.

Table 13.4 – Pedestrian Amenity Thresholds

Magnitude of Change (Impact)	Threshold
Major	Doubling of traffic flow or HGV component where the footway width is sub-standard (versus current design standards)
Moderate	Between 50% – 100% increase in traffic flow or HGV component where the footway width is sub-standard
Minor	Doubling of traffic flow or HGV component where the footway width is satisfactory
Negligible	Between 50% – 100% increase in traffic flow or HGV component where the footway width is satisfactory
No Change	No perceptible change in traffic flow or HGV component, and therefore no perceptible change in pedestrian amenity

Fear and Intimidation

- 13.28. Fear and intimidation can also increase as a result of rising traffic flows. This is influenced by a number of factors, including the volume of traffic, HGV content, nature and frequency of cycle infrastructure, and the width of the footway.
- 13.29. In addition, The Guidelines for the Environmental Assessment of Road Traffic gives the following example of fear and intimidation hazard definition, as set out in Table 13.5:

Table 13.5 – Fear and Intimidation Hazard Definition

Degree of Hazard	Average Traffic Flow over 18 hr Day (vehicles/hour)	Total 18 hr HGV Flow	Average Speed over 18 hr day (mph)
Extreme	1,800 +	3,000 +	20 +
Great	1,200 – 1,800	2,000 – 3,000	15 – 20
Moderate	600 – 1,200	1,000 – 2,000	10 – 15

- 13.30. This has been used to inform the criteria for determining the impact of the Proposed Development on fear and intimidation, as set out in Table 13.6.

Table 13.6 – Fear and Intimidation Thresholds

Magnitude of Change (Impact)	Threshold
Major	Change in degree of hazard between moderate and extreme
Moderate	Change in degree of hazard between great and extreme
Minor	Change in degree of hazard between moderate and great
Negligible	No change in degree of hazard
No Change	No perceptible change in traffic flow, HGV flow or average speed, and therefore no perceptible change in pedestrian amenity

Severance

- 13.31. Severance is a perceived division that occurs when a traffic link separates part of an existing community. This can occur when a road becomes too heavily trafficked (making crossing the road difficult) or when a new route divides existing land creating a physical barrier.
- 13.32. The Guidelines for the Environmental Assessment of Road Traffic states that:
- “The measurement and prediction of severance is extremely difficult. The correlation between the extent of severance and the physical barrier of a road is not clear and there are no predictive formulae which give simple relationships between traffic factors and levels of severance.”*
- 13.33. The following indicators are set out in the Guidelines:
- 30% flow increase – slight separation effects;
 - 60% flow increase – moderate separation effects; and
 - 90% flow increase – substantial separation effects.

- 13.34. This has been used to inform the criteria for determining the impact of the Proposed Development on fear and intimidation, as set out in Table 13.7 below:

Table 13.7 – Severance Thresholds

Magnitude of Change (Impact)	Threshold
Major	Over 90% change in traffic flows on relevant links
Moderate	Between 60%-90% change in traffic flows on relevant links
Minor	Between 30%-60% change in traffic flows on relevant links
Negligible	Less than 30% change in traffic flows on relevant links
No Change	No perceptible change in traffic flows, and therefore no perceptible change in severance

Collisions and Road Safety

- 13.35. The assessment of collision risk and highway safety is based upon knowledge of existing collisions. These are used to identify locations of specific concern (commonly referred to as 'collision blackspots'). For example, should a particular link or junction be found to have a high incidence of collisions, then the addition of significant traffic volumes could have a further detrimental impact on highway safety and mitigation measures may be required.
- 13.36. Personal Injury Collision data for the major junctions along the highway network adjacent to the Site has been obtained from the TfGM for the most recent five-year period. This has been used to inform the criteria for determining the impact of the Proposed Development on collisions and road safety, as set out in Table 13.8.

Table 13.8 – Collisions and Road Safety Thresholds

Magnitude of Change (Impact)	Threshold
Major	Over 50% change in traffic flows at location with existing adverse collision record (blackspot).
Moderate	30%-50% change in traffic flows at location with existing adverse collision record
Minor	10%-30% change in traffic flows at location with existing adverse collision record
Negligible	Less than 10% change in traffic flows at location with existing adverse collision record
No Change	No perceptible change in traffic flows, and therefore no perceptible change in collisions and road safety

Impact Categories

- 13.37. For each of the potential effects above, impacts are categorised in terms of the following:
- **Positive or Negative** – positive impacts will be associated with a reduction in traffic flows along a link, whereas negative impacts will be associated with an increase in flows;
 - **Value (Importance)** – will be assessed in accordance with the IEMA Guidelines by effect, see Table 13.9 below;
 - **Magnitude** – relates to the degree of alteration from the baseline in accordance with the IEMA Guidelines by effect;

- **Duration** – short-term impacts are considered to be 0 to 5 years including the construction period and on completion, medium-term impacts are considered to be 5 to 15 years including mitigation establishment, and long-term impacts are considered to be 15 years onwards for the life of the development;
- **Reversibility** – any construction impacts are considered reversible, whereas any operational impacts are considered permanent unless suitable mitigation is provided; and
- **Likelihood** – all assessments in this Chapter are based on a series of assumptions and calculations using surveyed datasets. These assessments give an accurate reflection of the forecast conditions and are therefore considered likely to occur.

13.38. Receptors will comprise pedestrians, cyclists, public transport users and drivers affected by the impacts of traffic generated by the Proposed Development. The receptors and their value (importance) are defined below:

Table 13.9 – Value (Importance) of Receptors

Magnitude of Change (Impact)	Threshold
International	None
National	None
Regional	Drivers along the A57 (M) Mancunian Way and the A56 Chester Road
Local	Drivers along the local highway network Pedestrians, cyclists, and public transport users within the vicinity of the Proposed Development

13.39. The IEMA Guidelines gives examples of sensitive locations as locations where specific environmental problems may occur such as accident (collision) blackspots, conservation areas, hospitals, and links with high pedestrian flows (e.g. near to schools). The sensitivity of each receptor in the study area has been defined on the following scale, with reference to the IEMA Guidelines and the local context of each receptor; professional judgement has also been used to determine the sensitivity of the receptor:

- **Very High** – The receptor has no ability to absorb change without fundamentally altering its present character, or is of international or national importance;
- **High** – The receptor has little ability to absorb change without fundamentally altering its present character, or is of international or national importance;
- **Medium** – The receptor has moderate capacity to absorb change without significantly altering its present character, or is it of high importance;
- **Low** – The receptor has considerable capacity to absorb change without significantly altering its present character, or is of low or no local importance; and
- **Negligible** – The receptor is tolerant of change without detriment to its character or is of no local importance.

13.40. Sensitivity judged as Very High, High or Medium results in Rule 2 being considered for that highway link. Sensitivity judged as Low or Negligible results in Rule 1 being considered for that highway link.

Significance Criteria

13.41. The magnitude of change (impact) resulting from the Proposed Development, has been assessed using the following scale, based on the methodology outlined above:

- Major;
- Moderate;

- Minor;
- Negligible; and
- No change.

13.42. Each effect has been assessed against the sensitivity of the receptor and the magnitude of change, as shown in the Table 13.10. Where more than one effect classification exists for any given scenario (e.g. minor or moderate), professional judgement has been used to assign a single significance criteria.

Table 13.10 – Matrix for Classifying Effects

		Magnitude of Change (Impact)				
		No Change	Negligible	Minor	Moderate	Major
Sensitivity/ Value	Very High	Neutral	Minor	Moderate or Major	Major	Major
	High	Neutral	Minor	Minor or Moderate	Moderate or Major	Major
	Medium	Neutral	Neutral or Minor	Minor	Moderate	Moderate or Major
	Low	Neutral	Neutral or Minor	Neutral or Minor	Minor	Minor or Moderate
	Negligible	Neutral	Neutral	Neutral or Minor	Neutral or Minor	Minor

Magnitude	Sensitivity		
	High	Medium	Low
Major	Major	Major	Moderate
Moderate	Major	Moderate	Minor
Minor	Moderate	Minor	Negligible
Negligible	Minor	Negligible	Negligible

13.43. The following scale of significance has been adopted for the effects, noting whether the effects will be permanent or temporary, direct or indirect, short, medium or long-term, and significant or not significant:

- Major Beneficial;
- Moderate Beneficial;
- Minor Beneficial;

- Negligible;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

13.44. Effects that are classified as Major or Moderate are considered to be significant. Effects classified as Minor or Negligible are considered to be not significant.

The Study Area

13.45. The extent of the study area has been defined using a combination of scoping discussions for the supporting TA, which involved meetings with Highways Officers at MCC and TfGM, and consideration of IEMA Guidelines.

13.46. On this basis, the study area is focused on the following junctions/links:

- Junction 1 - A56/Great Jackson Street priority junction;
- Junction 2 - A56/A5067/A57(M) Deansgate Interchange signalised roundabout;
- Junction 3 - City Road East/Medlock Street priority junction; and
- Junction 4 - Melbourne Street/Great Jackson Street priority junction.

Scenarios Tested

13.47. As part of this ES Chapter, the worst-case scenarios have been assessed for robustness; these are as follows:

- Scenario 1: Baseline (including all Committed and Cumulative Development traffic flows); and
- Scenario 7: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6.

13.48. To establish the Baseline position, traffic data from surveys undertaken in 2022 (Junctions 1 – 3) and base flows for the 2028 future year from the CSP2 development (MCC Reference: 126668/FO/2020) have been extracted for Junction 4. In addition, consideration of the Committed Development schedule has been undertaken; only the developments that will have a material impact in the study area have been included to establish the Baseline position.

13.49. All relevant committed and cumulative development flows which are included within the Baseline traffic flows are noted within this chapter. It is noted that the Plot 11 First Street has started on site, and this has been considered as a cumulative scheme. Notwithstanding, this scheme is proposed to generate significant levels of vehicular traffic.

13.50. The scenarios for assessment are the two worst case scenarios as all committed and cumulative developments have been considered within the Baseline.

13.51. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme.

13.52. We have considered this with regard to traffic and transport and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that this chapter will be testing the development as a whole.

Baseline Conditions

Local Highway Network

Great Jackson Street

- 13.53. Great Jackson Street connects the A56 Chester Road to the A5103 Medlock Street in a semi-circular route from west to east, continuing on as City Road East past the priority junction with Garwood Street to the east of the Site.
- 13.54. The roads form the minor arm of a priority junction at both ends and have a combined length of circa 580m. The priority junction at the western end of Great Jackson Street with the A56 Chester Road has a left-in, left-out arrangement, whilst the priority junction at the eastern end of the road (City Road East/Medlock Street) allows for all traffic movements.
- 13.55. Great Jackson Street comprises a single carriageway with a typical width of c. 10m. There are also footways of an average c. 2.5m with on both sides of the road, along with street lighting at regular intervals on the southern side of the road. The road is subject to a speed limit of 20mph.
- 13.56. Great Jackson Street is in Zone 4 of Manchester City Centre's Controlled Parking Zone (CPZ), where Pay and Display (P&D) parking is provided for up to 10 hours between 08:00 and 20:00 on Mondays to Sundays, with no return within 1 hour and no charge for parking on a Bank Holiday.
- 13.57. Where the road meets other minor junctions leading into other car parks or minor roads, there are parking restrictions present in the form of double yellow lines.

Melbourne Street

- 13.58. Melbourne Street serves as a link between Great Jackson Street and the A57 Mancunian Way, with a length of circa 70m. At its northern end, it forms a priority junction with Great Jackson Street, whereas at its southern end it commences at the junction between the end of the Ring Road slip road and Crown Street.
- 13.59. Melbourne Street comprises a single carriageway with a typical width of c. 7m and footways of c. 2.5m on both sides of the road. There are some street light columns along both sides. The road is also within Zone 4 of the CPZ and has a number of P&D bays along the road, with parking restriction in the form of double yellow lines along the rest of the carriageway and junctions.
- 13.60. At the time of writing, Melbourne Street is closed at its southern end and does not currently permit vehicular movement to/from the A57 Mancunian Way due to ongoing construction works associated with CSP2. The current speed limit along the Mancunian Way slip road is 30mph, reducing to 20mph along Melbourne Street.
- 13.61. Melbourne Street currently provides pedestrian access to Hulme and other areas to the south of the City Centre via a pedestrian and cycle bridge over the Mancunian Way, located at the end of Melbourne Street. This bridge can be accessed within an approximate 250m walk from the centre of the Site.

Silvercroft Street

- 13.62. Providing the north-western boundary to CSP3, Silvercroft Street extends on an east-west alignment from a priority junction with Great Jackson Street towards other Great Jackson Street Framework (GJS Framework) Plots such as Crown Street Phase 1 and Phase 2.
- 13.63. Silvercroft Street is in the process of major refurbishment works as part of wider GJS Framework proposals. The carriageway is currently 5.5m wide, with a minimum of 2m footways on both side of the carriageway. As part of works associated with the wider GJS Framework, Silvercroft Street will form the access route for an underground car park (as part of CSP2).

Owen Street

- 13.64. Owen Street currently links Deansgate with Great Jackson Street, extending for c. 210m.

- 13.65. As per Silvercroft Street, Owen Street has undergone a major refurbishment as part of wider GJS Framework proposals. At the time of writing, the carriageway and eastern footway have been fully completed, with only the western footway to be fully constructed.
- 13.66. The road is privately owned and has barrier controlled access at both ends. The carriageway is c. 5.5m wide with vehicular speeds limited by the barrier system acting as a traffic calming measure. The current footway to the east ranges in width, with a minimum of c. 2.5m. Street lighting is provided along the eastern side of the carriageway. On-street parking is restricted by double red line markings along the entirety of the road.

Garwood Street

- 13.67. Located to the east of the Site, Garwood Street serves as a link between Great Jackson Street / City Road East and the A57 Mancunian Way, with a length of circa 85m. At its northern end, it forms a priority junction with Great Jackson Street and City Road East, whereas at its southern end it forms a priority junction with the A5103 leading into Medlock Street/A5103 Princess Road.
- 13.68. The road is clearly signed to prevent westbound entry onto A5103. In the northbound direction from the Mancunian Way, there are signs indicating the change of speed limit from 30mph along the slip road to 20mph along Garwood Street.
- 13.69. Garwood Street comprises a single carriageway of c. 10m in width and wide footways of up to c. 5m on both sides of the road. There are some street light columns present along the road. The road is also within Zone 4 of the CPZ with P&D bays in place. There are also parking restrictions in the form of double yellow lines at junctions along the road.

A57 (M) Mancunian Way

- 13.70. Located to the south of the Site, the A57 (M) Mancunian Way forms part of the inner ring road around Manchester City Centre by connecting Deansgate in the west to Manchester Piccadilly in the east. The road commences at a signalised junction with the A57 Regent Road, A6042 Trinity Way and Water Street, then extends to the east for approximately 2.75km before it terminates and continues on as the A635 Ring Road.
- 13.71. In the vicinity of the Site, the A57 (M) Mancunian Way comprises a dual carriageway with a total width of c. 28m and up to three lanes in each direction. As of February 2022, the road is now subject to a speed limit of 30mph (reduced from 50mph) and is lit by regularly spaced lighting columns.

A56 Chester Road

- 13.72. The A56 Chester Road is one of the main radial routes into Manchester City Centre and provides the main route for outlying towns such as Altrincham and Sale to gain access to the city. In the vicinity of the Site, Chester Road has an overall carriageway width of c. 19m.
- 13.73. Chester Road provides access to/from the Site from the north via the priority junction with Great Jackson Street, with a left-in, left-out arrangement directing traffic westbound on Chester Road. To the north-west of the Site, the A56 Chester Road meets the A57 (M) Mancunian Way and A5067 Chorlton Road at a grade separated signalised roundabout, known as Deansgate Interchange.
- 13.74. Chester Road serves as a bus route into and out of Manchester and also features an on-road cycle lane along its southern side and an unsegregated footway / cycleway on its northern side. Chester Road is subject to a 30mph speed limit and is lit by regularly spaced lighting columns.

Medlock Street

- 13.75. Medlock Street commences at the signalised junction with the B6469 Whitworth Street West (to the north-east of the Site) and runs on a broadly north-south alignment from approximately 365m before terminating at the signalised junction with the A5103 Princess Road and associated slip roads for the A 57 (M) Mancunian Way. Medlock Street, continuing from Princess Road, is another main radial route into Manchester City Centre.

- 13.76. Medlock Street has an overall average carriageway width of c.12m in proximity of the Site but is noted to include flare lanes as the carriageway approaches the junctions to the north and south. Medlock Street benefits from a both on-road and off-road cycle infrastructure in both directions and is subject to a 30mph speed limit and is lit by regularly spaced lighting columns.

River Street

- 13.77. Located to the east of Plot D, River Street is located between Medlock Street and Garwood Street and is approximately 150m in length; the carriageway is one-way only in a westbound direction (from Medlock Street to Garwood Street).
- 13.78. River Street currently provides access to residential and commercial uses, and a Premier Inn hotel which fronts onto Medlock Street. It comprises a single carriageway of c.8m in width, which is narrowed by the presence of on-street parking bays on both sides of the carriageway; notwithstanding this, there are also parking restrictions in the form of double yellow lines adjacent to junctions along the length of River Street.
- 13.79. Wide footways are present of up to c.5m on both sides of the road, and there are street light columns present along the length of the road.

Highway Safety

- 13.80. Personal Injury Collision data for the main junctions along the highway network adjacent to the Site has been obtained from the TfGM reported road collisions database for the most recent five-year period. This is shown in Table 13.11.

Table 13.1 – Personal Injury Collision Data Summary

Junction/Link	Slight	Serious	Fatal	Totals
Great Jackson Street	0	0	0	0
City Road East	1	0	0	1
Garwood Street	0	0	0	0
Great Jackson Street / A56 Chester Road	1	2	0	3
A56 Chester Road	0	0	0	0
City Road East / Medlock Street	2	1	0	3
A56 Chester Road / Deansgate	1	0	0	1
A56 Deansgate Interchange	11	1	0	12
A57 Mancunian Way	6	1	0	7
Owen Street	0	0	0	0
River Place	0	0	0	0
Totals	22	5	0	27

- 13.81. There has been a total of 27 collisions recorded in the latest five-year period available, which resulted in 22 slight injuries and 5 serious injuries. There have been no fatal injuries recorded in the vicinity of the Site.
- 13.82. There have been no collisions recorded in the immediate vicinity of the Site along Great Jackson Street, Melbourne Street, Silvercroft Street or Owen Street, according to TfGM's available data.
- 13.83. On the above basis, it is clear that the safety record is not particularly onerous or indicative of a pre-existing safety issue that would be exacerbated by the Proposed Development. It is therefore concluded that road safety is not a material concern in the context of the Proposed Development.

Pedestrian Accessibility

- 13.84. Research has indicated that acceptable walking distances depend on a number of factors, including the quality of the development, the type of amenity offered, the surrounding area, and other local facilities. The Chartered Institution for Highways and Transportation (CIHT) document entitled 'Providing for Journeys on Foot' suggests walking distances which are relevant to this Chapter; being 500m as a 'desirable' catchment, 1,000m as an 'acceptable' catchment and 2,000m as the 'preferred maximum'.
- 13.85. The Site is well located in relation to local facilities and services within Manchester. Most notably, several bus stops along the A56 Chester Road and A5103 Medlock Street are located within the 500m walking catchment. Future residents can also access several office buildings east of the Site, the Manchester School of Acting, several small coffee shops, and the Castlefield Gallery, as well as other local facilities.
- 13.86. The First Street development comprising a Sainsbury's, HOME theatre, public houses, several bars and restaurants is also within the 500m walking catchment. Once the CSP2 development is completed, a primary school will also be available to residents within 500m of the Site.
- 13.87. Within 1,000m of the Site, more bus stops and tram stops are accessible for residents of the Site. The Deansgate Railway Station and the Deansgate-Castlefield Metrolink station can be accessed within an 8-minute walk (or 600m walk distance) north of the Site. The entirety of the leisure / entertainment in the Deansgate and Spinningfields areas is also accessible, with Deansgate Locks fronting Whitworth Street West, the Bridgewater Hall and Manchester Central Convention Complex, Manchester Great Northern (comprising the ODEON cinema, bowling alley, and food/drink establishments), Science and Industry Museum and Beetham Tower.
- 13.88. To the east of the Site, the Oxford Road rail station is accessible within 1,000m, along with the Palace Theatre and more entertainment facilities. The Oxford Road Corridor is accessible too, and it is known as the busiest bus corridor in Europe, connecting Manchester City Centre to the surrounding neighbourhoods including Ardwick, Hulme, Longsight, Moss Side and Rusholme. Along the corridor are many pharmacies, a Tesco and Sainsbury's store, food and drink outlets, and health clubs.
- 13.89. To the south of the Site, the Manchester Metropolitan University campus lies within the 1,000m catchment, which includes student accommodation along with places of worship. There are also several primary schools, Hulme Park and St Georges Park.
- 13.90. At 2,000m beyond the Site, the whole of Manchester City Centre including the Central Business and Retail Districts, Manchester Piccadilly, Piccadilly Gardens, Market Street, Shudehill, the Northern Quarter, Chinatown, Salford Central, the outskirts of Ordsall and Old Trafford, Hulme, Moss Side, Brunswick, Manchester Science Park and the University of Manchester campus are all within reach. The Site is strategically situated within Manchester City Centre such that the surrounding facilities can benefit future residents of all ages.
- 13.91. As part of the Manchester and Salford Inner Relief Route (MSIRR) works programme, the Mancunian Way / A56 Chester Road roundabout (Deansgate Interchange) has been recently improved to offer capacity improvements and also improved pedestrian and cycle linkages, which will therefore be of benefit to residents of the Proposed Development when passing through this junction.
- 13.92. The topography of the local area is generally flat and conducive to pedestrian trips, and the area benefits from natural surveillance from the commercial and residential properties that abut all the main walk routes.
- 13.93. The Site is therefore considered to be highly accessible by foot with various employment, education, health, retail and leisure facilities within walking distance of the Site. The Site is also conveniently located to various public transport routes and interchanges.

Cycle Accessibility

- 13.94. In order to assist in assessing the accessibility of the Site by cycle, an 8km cycle catchment has been considered. The 8km catchment (5 miles) considered to be the maximum acceptable cycling distance for most people and is based on the 2019 National Travel Survey statistics, which demonstrates that 82% of cycling trips were under 5 miles (8km).

- 13.95. The National Model Design Code – Part 2 (DLUHC, 2021) also references this distance, expressing “the aim that walking and cycling should be the first choice for short local journeys, particularly those of 5 miles or less.”
- 13.96. The 8km catchment extends as far as Blackley in the north, Fairfield to the east, Didsbury in the south and Trafford Park to the west. There are multiple local on and off-road routes that surround the Site, for example; along Great Jackson Street and City Road East, the A56 Chester Road, Whitworth Street West and Medlock Street and adjacent to the Bridgewater Canal
- 13.97. Some of the most attractive cycle routes in the area lie alongside the waterway network. There are cycle routes alongside both the Bridgewater Canal and the River Irwell that are easily accessible from the Site. Local routes in the vicinity of the Site have been developed to include segregated cycle lanes as part of the Oxford Road Bus Priority Package. The segregated cycle lanes are part of the city’s new high-quality cycle infrastructure to improve cyclist safety along the Oxford Road Corridor.
- 13.98. National Cycle Route 6 is located some 650m to the north of the Site on Liverpool Road. Route 6 passes through Watford, Luton, Milton Keynes, Northampton, Market Harborough, Leicester, Derby, Nottingham, Worksop, Sheffield, Manchester, Blackburn, Preston, Lancaster, Kendal and Windermere, and will connect London and Threlkeld in Cumbria when complete. More locally, the route connects the Site to areas in the north west of Greater Manchester such as Radcliffe, and to the south west including areas such as Chorlton-cum-Hardy.
- 13.99. The local cycle network is also a part of Greater Manchester’s cycling and walking infrastructure proposal, named the “Bee Network”. The Bee Network comprises signed routes that mark the most direct and pleasant way to navigate an area on foot or by bike.
- 13.100. The Site is therefore considered to be highly accessible by bicycle and would provide a realistic alternative to travel by car.

Public Transport Accessibility

- 13.101. Developed by Transport for Greater Manchester, Greater Manchester Accessibility Levels (GMAL) are a measure of the accessibility of a point to both the conventional public transport network (i.e. bus, Metrolink and rail) and Greater Manchester’s Local Link (flexible transport service), considering walk access time, service availability, and average waiting time. The method is essentially a way of measuring the density of the public transport provision at any location within the Greater Manchester region.
- 13.102. The accessibility index score is categorised into eight levels (1 to 8), where level 8 represents a high level of accessibility (described as ‘excellent’) and level 1 represents a low level of accessibility (described as ‘very poor’).
- 13.103. The Site is located in an area with a GMAL rating of 8 – the highest possible rating, with excellent accessibility. This is a particular strength of the Site, which offers strong multi-modal opportunities.

Bus Accessibility

- 13.104. Guidance within the National Model Design Code – Part 2 (DLUHC, 2021) states: “Generally, people are prepared to walk further to a railway station or tram stop (10 minutes) [800m walking distance] than to a bus stop (5 minutes) [400m walking distance].” These distances are also cited in the CIHT document ‘Planning for Walking’ (2015).
- 13.105. The nearest bus stop is located to the north-east of the Site on Medlock Street, within a c. 400m (c. 5-minute) walk of the Site. Future residents could also walk c. 550m (c. 6.5-minute walk) to the bus stops along Whitworth Street West and opposite the Deansgate rail station with more services and the Number 2 Free Bus. Table 13.12 below details the bus services that call at these stops and their associated frequencies

Table 13.2 – Summary of Bus Service Frequencies in the Vicinity of the Site

Bus Service	Route	Peak Hourly Frequency		
		Mon – Fri	Sat	Sun/Hols
From Medlock Street				
84	Manchester – Whalley Range – Chorlton – Chorlton Green	Hourly	Hourly	-
256	Manchester – Hulme – Stretford – Davyhulme – Flixton	10 mins	15 mins	30 mins
733	Cheetham Hill – Whalley Range High School (school bus)	1 in the AM 1 in the PM	-	-
From Whitworth Street West				
255	Manchester – Old Trafford – Stretford – Urmston – Flixton – Partington	30 mins	30 mins	Hourly
291	Manchester – Old Trafford – Trafford Park – intu Trafford Centre	30 mins in the early AM	-	-
X50	Manchester – Old Trafford – intu Trafford Centre	10 mins	10 mins	10 mins
X58	Manchester – Davyhulme – Flixton Express	1 in the AM	-	-

- 13.106. As shown in Table 13.12, there are frequent bus services (in combination) stopping close to the Site ,which provide convenient access to locations such as The Trafford Centre, Manchester City Centre, Urmston and Stretford, amongst others.
- 13.107. Furthermore, the Site is situated within a c. 550m walking distance to Whitworth Street West, which is one of the calling points of the Number 2 Manchester free bus route. The free bus is a service providing direct access to the Deansgate and Oxford Road railway stations along with key city centre locations. The free bus frequencies are detailed in Table 13.13:

Table 13.3 – Summary of Free Bus Service Frequencies in the Vicinity of the Site

Free Bus Service		Peak Frequency		
		Weekday	Saturdays	Sun/Hols
1	Piccadilly – Piccadilly Gardens – Chinatown – Market Street – Deansgate – Opera House – Albert Square – New York Street – Central Coach Station circular	07:00 – 22:00 Every 10 mins (Every 15 mins after 18:30)	08:30 – 22:00 Every 10 mins (Every 15 mins after 18:30)	09:30 – 18:00 Every 12 mins
2	Piccadilly – Oxford Road – Deansgate – Manchester Victoria – Shudehill – Northern Quarter circular	06:30 – 22:00 Every 10 mins (Every 15 mins after 18:30)		
2 (Peak Only)	Piccadilly – Oxford Road – Deansgate – Salford Central – Manchester Victoria – Shudehill – Northern Quarter circular	06:30 – 09:10 and 16:00 – 18:30	-	-

- 13.108. Overall, the Site is highly accessible by bus with a large number of services available within walking distance of the site.

Rail Accessibility

- 13.109. The Chartered Institution of Highways and Transportation (CIHT) document, 'Planning for Public Transport in Developments' notes that those travelling to a site by rail will typically be prepared to walk further to the site than those travelling by bus, with a preferred distance of 800m.
- 13.110. The nearest railway station is Deansgate Railway Station, located c. 600m (c. 7-minute walk) to the north of the Site. A summary of rail services from the station is summarised in Table 13.14.

Table 13.4 – Summary of Rail Services Frequencies from Deansgate Railway Station

Destination	Service Frequency		
	Peak Weekday	Peak Saturday	Peak Sunday
Blackpool North	2	1	1
Bolton	3	2	1
Liverpool Lime Street	2	2	1
Preston	2	1	1
Southport	2	2	1
Stockport	1	1	1
Warrington Central	2	2	1
Wigan	1	1	1

- 13.111. The rail services that run to Deansgate Railway Station provide regular access to various locations across the North West of England, including, Liverpool, Manchester Airport, Southport and Manchester Oxford Road, amongst others. Trains run throughout the day and evening 7 days a week.
- 13.112. In addition to the locations noted above, they also serve key local destinations such as Bolton, Wigan, Preston, Buxton, Birchwood, Widnes and Warrington.
- 13.113. A short connection from Deansgate to Manchester Oxford Road or Manchester Piccadilly facilitates for journeys to destinations further afield such as London, Nottingham, Norwich, Leeds, Hull and Sheffield.
- 13.114. It is noted that the provision of rail services will change over time in response to current circumstances. The rail frequencies are accurate at the time of writing, whereas up-to-date rail times can be found on Northern Rail's website: northernrailway.co.uk/travel/timetables.
- 13.115. It is therefore considered the Site is highly accessible via rail.

Metrolink (Light Rail) Accessibility

- 13.116. There are Metrolink stops located at Deansgate-Castlefield (c. 550m or c. 6.5-minute walking distance north of the Site). Table 13.15 outlines the frequencies of services that can be utilised at this Metrolink stop.

Table 13.5 – Summary of Metrolink Services Frequencies from Deansgate-Castlefield Station

Route	Monday to Thursday	Friday and Saturday	Sundays/Hols
[Blue Line] Eccles or MediaCity UK – Ashton-Under-Lyne	6-minute frequency between 05:53 and 23:03	6-minute frequency between 05:53 and 00:03	6-minute frequency between 06:53 and 22:53
[Purple Line] Altrincham – Piccadilly	12-minute frequency between 05:49 and 23:37	12-minute frequency between 05:49 and 00:37	12-minute frequency between 06:49 and 23:37

Route	Monday to Thursday	Friday and Saturday	Sundays/Hols
[Green Line] Altrincham – Bury	12-minute frequency between 05:49 and 23:01	12-minute frequency between 05:49 and 00:01	12-minute frequency between 06:49 and 23:01
[Pink Line] East Didsbury – Rochdale	12-minute frequency between 05:50 and 23:14	12-minute frequency between 05:50 and 23:50	12-minute frequency between 06:46 and 22:46
[Navy Line] Victoria – Manchester Airport	12-minute frequency between 05:57 and 23:09	12-minute frequency between 05:57 and 00:09	12-minute frequency between 06:52 and 23:04
	20-minute frequency between 03:00 and 06:00	20-minute frequency between 03:00 and 06:00	20-minute frequency between 03:00 and 07:00

13.117. The Metrolink services provide access to the Site seven days a week with trams running from a variety of locations within Manchester and the wider area between 6 and 20 minutes all day and into the evening.

13.118. It is therefore considered that the Site is highly accessible via Metrolink.

Accessibility by Sustainable Modes Summary

13.119. The above sections have demonstrated that the Site is highly accessible by active and sustainable modes of transport; the surrounding area exhibits excellent levels of pedestrian and cycling infrastructure, and there are a number of public transport opportunities within walking distance of the Site.

13.120. The Site is well located to take advantage of the excellent existing public transport facilities, including bus, Metrolink and rail, in addition to walking and cycling opportunities, which will therefore provide viable alternatives to travel by car.

Traffic Surveys

13.121. As part of scoping discussions with Highways Officers at MCC and TfGM, it was agreed that new traffic surveys would be undertaken at key junctions on the local highway network:

- A56/Great Jackson Street priority junction;
- City Road East/Medlock Street priority junction; and
- A56/A5067/A57(M) Deansgate Interchange signalised roundabout.

13.122. In addition, consideration would be given to the crossroads junction of Great Jackson Street with the existing section of Melbourne Street (to the west of Great Jackson Street), and the new section of Melbourne Street (to the east of Great Jackson Street), which is proposed to serve the consented Plot F1 of the GJS Framework and Tower E2 of the CSP3 Site.

13.123. At the time of writing, Melbourne Street is closed at its southern end and does not currently permit vehicular movement to/from the A57 Mancunian Way due to ongoing construction works associated with CSP2. On this basis, base flows for the 2028 future year have been extracted from the CSP2 development (MCC Planning Reference: 126668/FO/2020) to establish an appropriate and suitable baseline position on Melbourne Street.

13.124. Further information is provided in the supporting TA included in Appendix 13.1.

Background Traffic

13.125. The future assessment years/scenarios include all applicable committed development flows, and this represents consideration of background traffic growth. On this basis, additional traffic growth factors (via TEMPro) would not be required.

- 13.126. It is noted that the ambition of both MCC Highways and TfGM is to reduce traffic in and out of the City Centre – as noted by being a key aim within the TfGM document City Centre Transport Strategy to 2040, which details the future role of the car and its alternatives within the city. The City Centre Transport Strategy is bold in its vision, with a central aim for 90% of all morning peak trips to the city centre to be made on foot, by cycle or using public transport before 2040, with walking to become the predominant mode of travel within the city centre.
- 13.127. Furthermore, with changes in travel habits/working patterns associated with the post-COVID-19 world, car travel to / from the city will likely further reduce – and not grow in the coming years – with the uptake in home working / flexible working.
- 13.128. It is considered that the 2022 Surveys + Committed Development flows represents a robust future Baseline scenario for assessment. This has been an approach taken on other schemes in Manchester and accepted by MCC and TfGM.

Committed Developments

- 13.129. All committed developments to be assessed were considered in detail; following a review of all associated Transport Assessments/Statements, it was shown that only a small number of committed developments generated a considerable number of two-way trips in the AM and PM peak hours, with a large number generating negligible or zero car trips.
- 13.130. Many of the committed developments are car-free or a demonstrated a net trip reduction; as such, only the following schemes and subsequent vehicular trip generation were extracted for inclusion within the Baseline scenarios.
- Crown Street Phase 2 (application reference: 126668/FO/2020);
 - Trinity Islands (application reference: 132429/FO/2021);
 - Plot F, Great Jackson Street (application reference: 132199/FO/2021);
 - Plot G, Great Jackson Street (application reference: 129273/FO/2021); and
 - Arundel Street (application reference: 123261/FO/2019).

Identification and Evaluation of Likely Significant Effects; Mitigation Measures

Construction Phase

- 13.131. The construction of the Proposed Development will result in a temporary increase of HGVs and cars / vans carrying construction workers and materials on roads surrounding the Site. This has potential impacts in relation to noise, air, dust and dirt and ground conditions which are considered elsewhere within the wider ES and standalone reports.
- 13.132. Vehicles would arrive via links that have significant baseline flows (such as the A57 (M) Mancunian Way, the A56 Chester Road and A5103 Princess Road). The anticipated number of trips related with the construction of the development has been provided by Renaker based on their recent experience of similar developments in the area; this is shown in Table 13.16.

Table 13.1 – Construction Phase Daily and Hourly Trips

Period	Daily Trips			Hourly Trips		
	Car trips	HGV trips	Total Trips	Car Trips	HGV Trips	Total Trips
Peak Construction (dig)	15-20	60-70	75-90	2-3	8-9	10-12
Steady State Construction (frame, façade, etc.)	15-20	6-8	21-28	2-3	1	3-4

- 13.133. The above information indicates that at the peak of construction activity, there would be up to 90 daily trips, which equates to approximately 12 trips per hour. During the steady state of construction, there would be up to 28 daily trips, which equates to approximately 4 trips per hour.
- 13.134. When compared to the existing traffic flows on the local highway network, this volume of construction traffic (between 4-12 trips per hour) would fall below the IEMA Guidelines assessment thresholds detailed earlier. In addition, this level of construction traffic is significantly less than the completed and operational development would generate, which is the focus of the assessment in this Chapter.
- 13.135. As described in the TA at Appendix 13.1, the existing Site is currently occupied by existing commercial and industrial uses. There is also a high level of general construction activity in the local area related to adjacent development Sites.
- 13.136. On this basis, the construction phase is therefore likely to have a direct, temporary, short-term (reversible), minor adverse effect at a local level for the following, which is **not significant**.
- Driver delay;
 - Public transport users;
 - Pedestrian delay;
 - Pedestrian amenity;
 - Fear and Intimidation;
 - Severance; and
 - Collisions and road safety.

Operational Phase

- 13.137. In line with the IEMA Guidelines assessment criteria detailed earlier in this Chapter, the effects of the operational phase of the Proposed Development have been assessed based on two rules (10% / 30% changes in traffic flows).
- 13.138. It is considered that the sensitivity of the links in the study area are Low, where specific environment problems are not likely to occur, based on the example locations in the IEMA Guidelines. It is therefore considered that the receptors have considerable capacity to absorb change without significantly altering their present character and are of low local importance.
- 13.139. On this basis, as the links are considered Low sensitivity, all assessments will be undertaken under Rule 1, which states there is a need for an environmental impact analysis if traffic flows have increased by more than 30% (or the number of HGVs will increase by more than 30%).
- 13.140. The percentage impact of the development proposals has been calculated for each link Table 13.17.
- 13.141. This assessment compares Scenario 1 - 'Baseline' (inclusive of all Committed and Cumulative traffic flows which would impact on the junctions/links within the study area) with Scenario 7 – 'Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6'.

Table 13.2 – Operational Phase Daily and Hourly Trips

Junction and Link		Reference	Scenario 1. Baseline			Scenario 7. Base + Development (All Phases)			% Increase		
			AM Peak	PM Peak	24h AADT	AM Peak	PM Peak	24h AADT	AM Peak	PM Peak	24h AADT
1	1	A56 Chester Rd (E)	1552	1659	27,337	1598	1715	28,208	2.98%	3.38%	3.19%
	2	Great Jackson Street	366	356	6,149	526	444	8,255	43.61%	24.61%	34.24%

Junction and Link		Reference	Scenario 1. Baseline			Scenario 7. Base + Development (All Phases)			% Increase		
			AM Peak	PM Peak	24h AADT	AM Peak	PM Peak	24h AADT	AM Peak	PM Peak	24h AADT
	3	A56 Chester Rd (W)	1,824	1,875	31,501	2,015	1,987	34,071	10.46%	5.92%	8.16%
2	4	A56 Chester Rd (E)	1,824	1,875	31,501	2,015	1,987	34,071	10.46%	5.92%	8.16%
	5	A57 Mancunian Way (SB) On-Slip	967	988	16,649	1,007	1,048	17,494	4.09%	6.04%	5.07%
	6	A57 Mancunian Way (S of Deans. Interchange)	2,184	1,914	34,899	2,240	2,035	36,394	2.52%	6.30%	4.28%
	7	A57 Mancunian Way (NB) Off-Slip	925	643	13,351	927	659	13,511	0.26%	2.54%	1.19%
	8	A5067 Chorlton Rd	1,000	967	16,746	1,003	970	16,803	0.32%	0.37%	0.34%
	9	A56 Chester Rd (W)	2,764	2,614	45,790	2,809	2,655	46,520	1.63%	1.55%	1.59%
	10	A57 Mancunian Way (NB) On-Slip	936	699	13,921	1,054	751	15,369	12.62%	7.44%	10.41%
	11	A57 Mancunian Way (N of Deans. Interchange)	1,727	1,627	28,560	1,863	1,754	30,797	7.86%	7.80%	7.83%
	12	A57 Mancunian Way (SB) Off-Slip	499	645	9,741	501	659	9,878	0.42%	2.18%	1.41%
3	13	Medlock Street (N)	1,027	1,211	19,059	1,053	1,236	19,493	2.51%	2.07%	2.27%
	14	City Road East	273	335	5,180	355	418	6,582	29.99%	24.71%	27.08%
	15	Medlock Street (S)	1,061	1,253	19,706	1,117	1,311	20,675	5.28%	4.61%	4.92%
4	16	Great Jackson Street (N)	394	425	6,976	508	527	8,813	28.94%	23.94%	26.34%
	17	Melbourne Street (W of GJS)	157	221	3,217	305	353	5,602	94.77%	59.58%	74.16%
	18	Great Jackson Street (S)	312	443	6,426	402	567	8,251	28.87%	28.08%	28.41%

13.142. The assessment shows that a percentage change greater than 30% as a result of the Proposed Development would only be observed at Link 1 (Great Jackson Street) and Link 17 (Melbourne Street). The changes in traffic flows are greater than 30% due to the low existing baseline traffic flows along these links. Notwithstanding, further assessment of driver delay, public transport users, pedestrian delay, pedestrian amenity, fear and intimidation, severance, and collisions and road safety for Links 1 and 17 are provided in the following sub-sections.

13.143. As the impact of the completed development is less than 30% across all the remaining links, no further assessment is necessary.

Driver Delay

13.144. The delay statistics from the junction capacity assessments in the TA (Appendix 13.1) have been used for these assessments.

Link 1 – Great Jackson Street

13.145. The Great Jackson Street link meets the A56 Chester Road at a priority junction, which comprises a left in, left out arrangement. This has been assessed using the JUNCTIONS software.

- 13.146. The JUNCTIONS assessment provides outputs for RFC, queuing and delay. With respect to Driver Delay, the delay statistics (in seconds) is the key consideration. The results are shown in Table 13.18.

Table 13.3 – Driver Delay (Great Jackson Street)

Link		Base (in s)		Base + Dev (in s)		Change (in s)	
No.	Description	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
6	Great Jackson Street	13.19	13.87	30.65	19.54	+17.46	+5.67

- 13.147. The results show an increase in delay of less than 30 seconds which is classified as a Negligible magnitude of impact.
- 13.148. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Link 17 – Melbourne Street

- 13.149. The Melbourne Street link currently meets Great Jackson Street at a priority junction as the minor arm; however, as part of recent redevelopment as part of the wider GJS Framework, Melbourne Street will extend to the east of Great Jackson Street resulting in a crossroads arrangement. On this basis, the future crossroads arrangement has been assessed as a worst-case assessment. This priority arrangement has also been assessed using the JUNCTIONS software; the results are shown in Table 13.19.

Table 13.4 – Driver Delay (Melbourne Street)

Link		Base (in s)		Base + Dev (in s)		Change (in s)	
No.	Description	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
17	Melbourne Street	18.42	22.38	24.19	30.70	+5.77	+8.32

- 13.150. The results show an increase in delay of less than 30 seconds which is classified as a Negligible magnitude of impact.
- 13.151. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Public Transport Users

- 13.152. There are currently no bus services that utilise Link 1 – Great Jackson Street or Link 17 – Melbourne Street; hence, there would be no impacts on public transport users.

Pedestrian Delay

- 13.153. Changes in delay to pedestrians considers the increase in traffic flow and IEMA Guidelines indicate that a 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour.

Link 1 – Great Jackson Street

- 13.154. The Great Jackson Street link has been assessed with respect to pedestrian delay and the results are shown in Table 13.20.

Table 13.5 – Pedestrian Delay (Great Jackson Street)

No.	Link Description	Base (in s)		Base + Dev (in s)		Change (in s)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
6	Great Jackson Street	2.61	2.54	3.75	3.16	+1.13	+0.61

13.155. The results show an increase in delay of less than 20 seconds which is classified as a Negligible magnitude of impact.

13.156. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Link 17 – Melbourne Street

13.157. The Melbourne Street link has been assessed with respect to pedestrian delay and the results are shown in Table 13.21.

Table 13.6 – Pedestrian Delay (Melbourne Street)

No.	Link Description	Base (in s)		Base + Dev (in s)		Change (in s)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
17	Melbourne Street	1.12	1.58	2.16	2.50	+1.05	+0.92

13.158. The results show an increase in delay of less than 20 seconds which is classified as a Negligible magnitude of impact.

13.159. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Pedestrian Amenity

13.160. Changes in amenity to pedestrians considers the Guidelines for the Assessment of Environmental Impact of Road Traffic, which state that a threshold for judging the significance of changes in pedestrian amenity is where the traffic flow, or the HGV component, changes by more than 50%.

Link 1 – Great Jackson Street

13.161. The Great Jackson Street link has been assessed for change in total vehicle flow in the above tables; it is noted there is not proposed to be a material increase in HGV movements on this link associated with the operational phase of the Proposed Development. The results of the change in traffic flows are shown in Table 13.22.

Table 13.7 – Pedestrian Amenity (Great Jackson Street)

Link	Base			Base + Development			% Change		
	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT
1 – Great Jackson St	366	356	6,149	526	444	8,255	+43.61%	+24.61%	+34.24%

- 13.162. The results show an increase in traffic flows of less than 50%. Furthermore, it is considered that the footway width on Great Jackson Street is satisfactory at present and will be improved further as part of the Proposed Development and wider works associated with other schemes within the GJS Framework area, creating enhanced pedestrian infrastructure, crossings and public realm. In addition, no material change in HGV flows is expected.
- 13.163. On this basis, the magnitude of impact is considered to be Negligible.
- 13.164. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Link 17 – Melbourne Street

- 13.165. The Melbourne Street link has also been assessed with respect to pedestrian amenity; it is also noted there is not proposed to be a material increase in HGV movements on this link associated with the operational phase of the Proposed Development. The results of the change in traffic flows are shown in Table 13.23.

Table 13.8 – Pedestrian Amenity (Melbourne Street)

Link	Base			Base + Development			% Change		
	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT
17 – Melbourne St	157	221	3,217	305	353	5,602	+94.77%	+59.58%	+74.16%

- 13.166. The results show an increase in traffic flows of between 50% - 100%.
- 13.167. It is considered that the footway width on Melbourne Street is satisfactory at present – and in addition, this will be improved further as part of the Proposed Development, creating enhanced pedestrian infrastructure, crossings and public realm. In addition, no material change in HGV flows is expected.
- 13.168. As per the IEMA Guidelines, an increase in traffic flows between 50% – 100% is considered to be a Moderate magnitude of impact if the footway width is sub-standard. However, as the existing footways are satisfactory at present, the magnitude of impact is considered to be Negligible.
- 13.169. The sensitivity of the link is Low, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Fear and Intimidation

- 13.170. The assessment of fear and intimidation considers the potential change in the degree of hazard.

Link 1 – Great Jackson Street

- 13.171. The Great Jackson Street link has been assessed and the results are shown in Table 13.24.

Table 13.9 – Fear and Intimidation – Change in Degree of Hazard (Great Jackson Street)

Link	Base			Base + Development			% Change		
	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)
1. Great Jackson Street	315 Hazard: N/A	45 Hazard: N/A	20 Hazard: Extreme	425 Hazard: N/A	45 Hazard: N/A	20 Hazard: Extreme	+110 Hazard: N/A	0 Hazard: N/A	20: Hazard: Extreme

13.172. Whilst the results do show a change in the traffic flow levels, the results show no change in the degree of hazard for any category; therefore, the magnitude of the impact is Negligible.

13.173. The sensitivity of the link is Low; therefore, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Link 17 – Melbourne Street

13.174. The Melbourne Street link has been assessed and the results are shown in Table 13.25.

Table 13.10 – Fear and Intimidation – Change in Degree of Hazard (Melbourne Street)

Link	Base			Base + Development			% Change		
	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)	18 Hour AAWT (veh/hr)	Total 18 Hour HGV Flow (veh)	Avg Speed (mph)
17. Melbourne Street	165 Hazard: N/A	0 Hazard: N/A	20 Hazard: Extreme	291 Hazard: N/A	0 Hazard: N/A	20 Hazard: Extreme	+126 Hazard: N/A	0 Hazard: N/A	20: Hazard: Extreme

13.175. Whilst the results do show a change in the traffic flow levels, the results show no change in the degree of hazard for any category; therefore, the magnitude of the impact is Negligible.

13.176. The sensitivity of the link is Low; therefore, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Severance

13.177. The assessment of severance has been undertaken at link level and considers the potential change in traffic flows.

Link 1 – Great Jackson Street

13.178. The Great Jackson Street link has been assessed and the results are shown in Table 13.26.

Table 13.11 – Severance – Change in Traffic Flows (Great Jackson Street)

Link	Base			Base + Development			% Change		
	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT
1 – Great Jackson St	366	356	6,149	526	444	8,255	+43.61%	+24.61%	+34.24%

13.179. The results show an increase in traffic flows of over 30%, but less than 60%. On this basis, the magnitude of the effect equates to Minor. It is worth noting that a new controlled Pelican crossing is proposed across Great Jackson Street to assist with pedestrian movements across the road, as part of the Proposed Development.

13.180. The sensitivity of the link is Low; and based on professional judgement, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Link 17 – Melbourne Street

13.181. The Great Jackson Street link has been assessed and the results are shown in Table 13.27.

Table 13.12 – Severance – Change in Traffic Flows (Melbourne Street)

Link	Base			Base + Development			% Change		
	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT	AM Peak	PM Peak	24 Hour AADT
17 – Melbourne St	157	221	3,217	305	353	5,602	+94.77%	+59.58%	+74.16%

13.182. The results show a worst-case increase in traffic flows of over 90% during the AM Peak, and between 60% - 90% increase when consideration is given to the total 24 Hour AADT, and less than 60% increase during the PM Peak. On this basis, the worst-case magnitude of the effect equates to Major.

13.183. However, it should be noted that this percentage increase is due to the low Baseline flows. During the AM Peak hour, there would be an increase of 2 – 3 vehicles travelling on Melbourne Street every minute. Whilst this an increase of over 90% change in traffic flow, the actual traffic flows remain very low (305 vehicles per hour equates to c. 5 vehicles per minute) and it is therefore not considered that this increase would materially impact on severance.

13.184. Moreover, a new controlled Toucan crossing is proposed across Melbourne Street to assist with pedestrian and cycle movements across the road, as part of the Proposed Development.

13.185. On this basis, noting there will only be a small increase in the actual number of vehicles using the Melbourne Street link, as well as the proposed crossing, it is considered that the magnitude of change would be Minor Adverse.

13.186. The sensitivity of the link is Low; and based on professional judgement, the significance of the effect is therefore Negligible in the long-term (permanent), at a local level, which is **not significant**.

Collisions and Road Safety

13.187. The assessment of collisions and road safety considers both the collision record and the change in traffic flows.

- 13.188. A full assessment of Personal Injury Collision (PIC) data for the highway network within the wider Study Area has been undertaken within the TA; this comprises data obtained from the TfGM reported road collisions database for the most recent five-year period.

Link 1 – Great Jackson Street

- 13.189. Whilst it is noted that three collisions have been recorded at the junction of the A56 Chester Road/Great Jackson Street in the last five years, no collisions have occurred on the Great Jackson Road link in the last five years.
- 13.190. As such, it is concluded that there is not an existing safety issue that is likely to be exacerbated by the Proposed Development on Great Jackson Street.
- 13.191. There would be no perceptible change in collisions. The significance of the effect is therefore Negligible in the long-term (permanent), at a local level which is **not significant**.

Link 17 – Melbourne Street

- 13.192. There have been no recorded collisions on the Melbourne Street link in the last five years. It is therefore not considered that there is an existing safety issue that is likely to be exacerbated by the Proposed Development.
- 13.193. On this basis, there would be no perceptible change in collisions. The significance of the effect is therefore Negligible in the long-term (permanent), at a local level which is **not significant**.

Cumulative Effects

- 13.194. As outlined above, the study area, the scenarios for assessment and traffic data sources for this Chapter of the ES are based on the TA.
- 13.195. The traffic flow scenarios for assessment include all committed and cumulative developments (which are considered to be the same in traffic and transport terms) as discussed with Highways Officers at MCC and TfGM as part of pre-application discussions.
- 13.196. The traffic flows that have been used for the TA (Appendix 13.1) and within this Chapter are therefore consistent and considered a worst case, cumulative assessment. All committed/cumulative developments included within the Baseline scenario are listed within the TA.

Mitigation Measures

Construction

- 13.197. As previously identified, the construction phase is likely to have a direct, temporary, short-term (reversible), Minor Adverse effect at a local level, which is **not significant** overall. No specific mitigation measures are therefore required.
- 13.198. Notwithstanding, as best practice, a Construction Environmental Management Plan (CEMP) will be prepared to support the Proposed Development, and this will seek to minimise the level of disruption caused during the construction phase of the development.
- 13.199. Precise details of the plan will be agreed via condition, but it is envisaged that the CEMP will predominantly consist of:
- Agreed traffic management measures to restrict construction vehicles in certain locations and routes at certain times of the day;
 - Travel Plan initiatives to encourage workers to travel to the Site in a sustainable manner;
 - Considerate construction practices (such as wheel washing) to mitigate impacts which are considered elsewhere in the noise, air and dust and dirt section of this ES; and
 - Ensuring managed access to adjacent uses within the GJS Framework area throughout construction.

Operational Phase

- 13.200. The completed and operational phase is likely to have a direct, permanent, long-term, Negligible effect at a local level, which is **not significant** overall.
- 13.201. Notwithstanding, the Proposed Development will deliver benefits to the local area through improved public realm, and pedestrian and cycle facilities, such as new controlled pedestrian/cycle crossings on Great Jackson Street (Pelican) and Melbourne Street (Toucan).
- 13.202. The Proposed Development will also be supported by a Framework Travel Plan (FTP) (Appendix 13.2), which aims to minimise the number of car trips generated by the development and encourage residents, staff and visitors to use sustainable modes of transport.
- 13.203. A range of short to medium-term initiatives and long-term initiatives are detailed in the FTP that will help to mitigate the impacts of the traffic associated with the Proposed Development and encourage modal shift over time. These include initiatives grouped into the following categories:
- FTP Policies;
 - Car Park Management;
 - Marketing and Promotion;
 - Measures to Encourage Walking;
 - Measures to Encourage Cycling;
 - Measures to Encourage Public Transport Use; and
 - Reducing the Need to Travel.

Residual Effects

- 13.204. Curtins has considered the anticipated effects of the Proposed Development on existing traffic conditions in the study area. The assessments have been informed by a combination of numerical analysis and professional judgement/experience.

Construction Phase

- 13.205. The construction phase is noted to have a direct, permanent, long-term, Neutral to Minor Adverse effect at a local level, which is **not significant** overall.
- 13.206. Table 13.28 demonstrates the residual effects during the construction phase following mitigation measures.

Table 13.1 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the Construction Phase

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				
Driver Delay	Drivers on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Public Transport Users	Public Transport Users	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Pedestrian Delay	Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Pedestrian Amenity	Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Fear and Intimidation	Cyclists and Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Severance	Cyclists and Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Collisions and Road Safety	Drivers, Pedestrians and Cyclists on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.

13.207. Following the implementation of the mitigation measures, the impacts of the construction phase would remain as Minor Adverse and **not significant**.

Operational Phase

13.208. The completed and operational phase is likely to have a direct, permanent, long-term, Neutral to Minor Adverse effect at a local level, which is **not significant** overall.

13.209. Table 13.29 demonstrates the residual effects during the completed and operational phase following mitigation measures.

Table 13.2 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Driver Delay	Drivers on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Public Transport Users	Public Transport Users	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Pedestrian Delay	Pedestrians on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Pedestrian Amenity	Pedestrians on Local Highway Network	FTP New Pedestrian/Cycle Crossings	Ongoing promotion of the Travel Plan process Implemented as part of the highway works/landscape design	Permanent, long-term Negligible effect. Not Significant.
Fear and Intimidation	Cyclists and Pedestrians on	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
	Local Highway Network			
Severance	Cyclists and Pedestrians on Local Highway Network	FTP New Pedestrian/Cycle Crossings	Ongoing promotion of the Travel Plan process Implemented as part of the highway works/landscape design	Permanent, long-term Negligible effect. Not Significant.
Collisions and Road Safety	Drivers, Pedestrians and Cyclists on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.

13.210. Following the implementation of these measures, the impacts of the operational phase would remain Negligible, which is **not significant**.

Monitoring

13.211. As noted above, an FTP (Appendix 13.2) has been prepared to support the Proposed Development. As part of the FTP process, travel surveys will be undertaken throughout the monitoring period to establish Baseline modal splits and to monitor progress towards agreed targets. Travel patterns will therefore be monitored during the occupation of the Proposed Development.

Reference List

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

- Ministry of Housing, Communities & Local Government, (2021). 'National Planning Policy Framework'. GOV.UK, London. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2;>
- Ministry of Housing, Communities & Local Government, (2014). National Planning Practice Guidance. GOV.UK, London. Available at: <https://www.gov.uk/government/collections/planning-practice-guidance;>
- Manchester City Council, (2012). 'Manchester Core Strategy 2012 – 2027'. Available at: [https://secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027.;](https://secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027;)
- Transport for Greater Manchester, (2021). 'Greater Manchester Transport Strategy 2040'. Available at: <https://tfgm.com/2040;>
- Great Jackson Street Development Framework (2018). Available at: https://secure.manchester.gov.uk/downloads/file/26044/great_jackson_street_srf_may_2018
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14. Wind Microclimate

Introduction

- 14.1. This Chapter of the ES has been prepared by WSP UK Ltd. and assesses the likely Wind Microclimate impacts of the Proposed Development upon the Site and surrounding area. This Chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.
- 14.2. This Chapter is accompanied by one technical appendix, Wind Microclimate Technical Report (appendix 14.1 [1]).
- 14.3. Specialist wind engineering advice was provided right from the start of the design process: this allowed the wider design team to consider and take on board 'wind microclimate' input whilst the design was evolving. This process also allowed wind mitigation measures to become an integral part of the architectural and landscaping design of the Proposed Development: for this reason, the wind microclimate conditions within and in the vicinity of the Proposed Development have been presented with its embedded wind mitigation strategy in place. More details of the landscaping and mitigation plan are provided the Wind Microclimate Technical Report (Appendix 14.1, [1]).
- 14.4. The authors of this Chapter are Stefano Cammelli (Director – Head of Wind Engineering at WSP UK Ltd.) and Andrea Camera (Engineer – Wind Engineering at WSP UK Ltd.). Stefano Cammelli is a wind engineering specialist with 20 years' experience in the provision of wind engineering consultancy services. He has an active professional involvement in the global wind engineering community through participation in committees, working groups and peer reviews and he is also a regular presenter at international conferences, with more than 50 publications in technical and industry journals. Stefano is a Fellow of the Institution of Civil Engineers and the current Chair of the UK Wind Engineering Society. Andrea is a wind engineer with 2 years' experience in the wind engineering industry, during which he has worked on a wide range of consultancy projects worldwide. Andrea is a Graduate Member of the Institution of Civil Engineers and a Member of the UK Wind Engineering Society.

Assumptions and Limitations

- 14.5. The following assumptions and limitations have been made when completing this ES Chapter:
- The LDDC Lawson Criteria, used to assess the impact of the Proposed Development with respect to pedestrian comfort, focuses on the effect of wind force on people's activities but do not factor in other environmental variables such as air temperature, solar radiation and relative humidity, which also affect people's perception of comfort
 - Outdoor seating amenities are to be in use primarily during the summer season. During the windier times of the year, it would be expected that these spaces would be suitable for standing use as usability is lower during these seasons (also due to other factors such as temperature and precipitation)
 - Conservatively, existing or proposed off-site landscaping were not explicitly modelled in the CFD simulations
 - The wind study focused on pedestrian level wind environment and excluded façade wind pressures, structural wind loads, internal airflows within buildings or impacts on vehicles

Legislative and Policy Context, Guidance

Legislation

- 14.6. There is no specific national legislation or planning policy guidance dealing with wind microclimate in terms of pedestrian comfort. However, the Lawson Criteria [2] - which are used to benchmark the pedestrian wind microclimate - are well-established in the UK.

National Planning Policy

- 14.7. The National Planning Policy Framework was revised on the 20th July 2021 by the Ministry of Housing, Communities & Local Government. The relevant paragraphs are as follows:
- 14.8. Paragraph 130 of the National Planning Policy Framework states that:
- "Planning policies and decisions should ensure that developments:*

- a) will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;*
- b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;*
- c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);*
- d) establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;*
- e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and*
- f) 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."*

Local Planning Policy

- 14.9. Manchester's Local Development Framework – Core Strategy Development Plan [3] was adopted by Manchester City Council on the 11th July 2012. It is the key document in Manchester's Local Development Framework and covers a period of 15 years from 2012 to 2027. It describes Manchester today and outlines the Council's vision for Manchester in 2027 along with the planning policies which will be used to deliver that vision.
- 14.10. 'Policy EN 2' on 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."

Guidance

- 14.11. The following guidance documents have been used during the preparation of this Chapter.

Guidelines for CFD Simulations

- 14.12. The following references have been used as technical references for the execution of the CFD simulations conducted as part of this assessment:
- "Best Practice Guideline for the CFD Simulation of Flows in the Urban Environment - Quality Assurance and Improvement of Microscale Meteorological Models", European COST Action 732.
 - "Guidebook for Practical Applications of CFD to Pedestrian Wind Environment around Buildings", Architectural Institute of Japan (AIJ).
 - "AIJ benchmarks for validation of CFD simulations applied to pedestrian wind environment around buildings", Architectural Institute of Japan (AIJ).

The Lawson Criteria

- 14.13. 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 Lawson Criteria have been adopted for this assessment.

The Historic England Advice Note

- 14.14. 'The Historic England Advice Note 4' (2022) seeks to guide people involved in planning for and designing tall buildings so that they may be delivered in a sustainable and successful way through the development plan and development management process.
- 14.15. The relevant paragraphs state that:
- 3.3 "The following factors need to be considered to determine the impacts a tall building could have upon the historic environment: ... the influence on local micro-climates such as creation of wind tunnels, canyon effect, overshadowing, glare, and air quality and effect on heritage assets in terms of the impact these micro-climatic changes could have upon their fabric, and how they are experienced."

4.5 “Using an understanding of the historic environment to inform the approach to tall building design can be achieved by considering the impact on the local environment: people’s experience of local character and the historic environment can be affected by factors such as wind and other microclimatic changes, overshadowing, and light pollution from the development of a tall building. In some cases, this has the potential to impact the physical fabric of heritage assets. It is important to test impacts on the local environment at design stage and present these through the application process to reduce the incidence of interventions being required to mitigate impacts post construction (which may in turn harm character and quality of a site, street or area).”

Assessment Methodology and Significance Criteria

Scenarios Tested

14.16. From a wind microclimate standpoint, the following eight (8) EIA scenarios were originally identified in the Scoping Report:

- Scenario 1: Baseline (existing Site in existing surrounds)
- Scenario 3: ‘Phase 1’ + ‘Phase 2’ + baseline
- Scenario 4: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + baseline
- Scenario 5: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + baseline
- Scenario 6: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + baseline
- Scenario 7: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + ‘Phase 6’ + baseline
- Scenario 12: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + baseline + consented schemes
- Scenario 13: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + ‘Phase 6’ + baseline + consented schemes

A list of the consented schemes that were included in the assessment is presented in Section 14.19. ‘Plot F’ was considered as part of the existing surrounds as detailed in Section 14.20.

14.17. The CFD simulations that were carried out during the early stages of the project allowed the most critical scenarios for the wind microclimate assessment to be identified. These four (4) scenarios, on which this ES Chapter focuses, are:

- Scenario 1: Baseline (existing Site in existing surrounds), see Figure 14.1
- Scenario 5: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ in existing surrounds (including projects under construction), see Figure 14.2
- Scenario 7: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + ‘Phase 6’ in existing surrounds (including projects under construction), see Figure 14.3
- Scenario 13: ‘Phase 1’ + ‘Phase 2’ + ‘Phase 3’ + ‘Phase 4’ + ‘Phase 5’ + ‘Phase 6’ in existing surrounds (including projects under construction) with the inclusion of consented schemes, see Figure 14.4.

The Study Area

14.18. For the purpose of the wind microclimate assessment, the study area has been chosen as a circle with a radius of approx. 500 m centred around the Site and includes all buildings surrounding the Site which might be affected by the Proposed Development. Beyond this radius, the impact of the Proposed Development with regard to pedestrian level wind is expected to be negligible. This approach is consistent with the guidelines provided within the document ‘A position paper on experimental and computational methods in wind engineering’ published by the UK Wind Engineering Society [4].

14.19. The following consented schemes within a 500m radius of the Site were modelled based on information from the design team and that is publicly available and included in the cumulative scenario (Scenario 13):

- 1 Alpha Place – 120113/FO/2018
- Plot 11 First Street – 125573/FO/2019 (*)
- Hotspit Press – 120635/FO/2108
- Plot G, 34 Great Jackson Street – 129273/FO/2021
- One City Road – 128002/FO/2020
- 2-4 Whitworth Street – 126308/FO/2020
- 325 Deansgate – 125804/FO/2019
- Plot H, Great Jackson Street Framework – 129406/FO/2021
- Crown Street Phase 2 (Educational facility only) – 126668/FO/2020 (*)
- Bridgewater House Great Jackson Street – 134694/FO/2022
- Arundel Street – 1232611/FO/2019 (*)
- One Medlock Street – 135419/FO/2022

(*) The CFD analysis was set up prior to works starting on site on Plot 11 First Street, Crown Street Phase 2 (Educational facility) and Arundel Street. These are therefore included in the cumulative scenario for the purpose of the wind microclimate assessment. Plot 11 First Street and Arundel Street are not expected to materially impact the wind conditions across and in the vicinity of the Site due to their distance from the Site. The educational facility part of Crown Street Phase 2 is also not expected to have an impact on the wind macroclimate conditions across and in the vicinity of the Site due to the relatively low-rise nature of the building.

14.20. As it is understood that 'Plot F' part of the 'Great Jackson Street' masterplan will be implemented before the Proposed Development, 'Plot F' was considered as part of the surrounding area in Scenario 5, Scenario 7 and Scenario 13.

Source of Effect

14.21. The wind microclimate around an urban environment is affected by terrain, buildings, and other obstructions. The introduction of a new building development can affect the local wind flow patterns, which can produce an uncomfortable and/or unsafe wind environment at pedestrian level. This is particularly important for tall buildings as fast-moving high-level winds can downdraft to street level along windward faces of buildings. As air then moves into the low-pressure wake of the building, it can accelerate around corners and/or through restrictions, causing localised regions of relatively high wind speed.

Assessment Methodology

14.22. The pedestrian-level wind environment in an urban setting will depend on the general wind conditions, as well as on the effects of the urban environment itself. Therefore, the assessment consists of three main parts: calculation of the urban environment's aerodynamic effect on the wind; which is then combined with historical wind data; and, finally, compared against criteria to quantify the discomfort and/or level of distress caused by the wind.

14.23. Computational Fluid Dynamics (CFD) simulations were used to quantify the local wind speeds within and in the vicinity of the Site of the Proposed Development at various street locations (e.g., pedestrian access routes, building entrances, outdoor seating areas) for a comprehensive range of wind directions. CFD, as a tool for pedestrian wind modelling, is well validated against wind tunnel tests and real-world data and is often considered advantageous due to its advanced visualisation and domain wide measurement capabilities. Also, CFD is performed at full scale with wind speeds calculated at tens of millions of discrete points, allowing for large amount of data to be used for the assessment of the wind microclimate conditions. Like any other tool, it has its own limitations - however - good quality CFD is increasingly becoming an accepted tool in modern standards and guidance documents [5].

14.24. The results presented within this ES Chapter make use of the wind statistics obtained from the meteorological station at Manchester Airport, corrected for the Site (accounting for upwind terrain and reference height at the Site), to determine the probability of local wind speeds exceeding comfort and safety thresholds for a range of common pedestrian activities. A detailed description of the wind climate analysis has been included in Section 2.4 of the Wind Microclimate Technical Report (Appendix 14.1, [1]).

Assessment Criteria

- 14.25. The criteria used in this study were based on the LDDC version of the Lawson Criteria (henceforth referred to as 'LDDC Lawson Criteria') and have been reproduced in Table 14.1. Like most criteria used in assessments of pedestrian wind conditions, they relate a threshold wind speed and a threshold frequency to the suitability of an activity. The frequency threshold for each criterion is 5% - or about two weeks and a half per year. It is also useful to assess frequency on a seasonal basis. For example, an outdoor seating area may require wind conditions suitable for sitting or standing in summer, but not in winter when the seating is unlikely to be used due to other factors, e.g., ambient temperature and precipitation. For season-specific results, the criteria are based on 5% of hours across the months in that season.
- 14.26. Additionally, criteria for safety have been defined based on 0.025% exceedance (~2.2 hours) per year. These are areas where someone could find walking difficult or even lose their footing. The criterion is reproduced in Table 14.2 below.

Table 14.1 – LDDC Lawson Criteria for Pedestrian Wind Comfort

Comfort Category	Wind speeds not to be exceeded by more than 5% of the time	Description
Sitting	4 m/s	Acceptable for frequent outdoor sitting use, e.g., restaurant, café.
Pedestrian Standing	6 m/s	Acceptable for occasional outdoor seating, e.g., general public outdoor spaces, balconies and terraces intended for occasional use, entrances, bus stops, covered walkways or passageways beneath buildings, etc.
Pedestrian Leisure Walking	8 m/s	Acceptable for strolling and general thoroughfare usage.
Business Walking	10 m/s	Can be tolerated if one's objective is to walk, run or cycle without lingering, e.g., external pavements, walkways.
Uncomfortable	>10 m/s	Not comfortable for regular pedestrian access.

Table 14.2 – LDDC Lawson Criteria for Pedestrian Wind Comfort

Safety rating	Threshold mean-hourly wind speed exceeded once per annum (0.025%)	Description
S15 - Unsuitable for the general public	>15 m/s	Presents a safety risk for pedestrians, especially to more vulnerable members of the public.
S20 - Unsuitable for able-bodied	>20 m/s	Presents a safety risk for all pedestrians.

Methodology for Defining Effects

- 14.27. The magnitude of impact of existing / off-Site receptors has been categorised using professional judgement based on the change in velocity observed from the 'Baseline'. The criteria for determining the magnitude of impact for the pedestrian comfort and safety assessments is summarised in Table 14.3.

Table 14.3 – Matrix for Determining the Existing / Off-Site Receptors Magnitude of Impact for Pedestrian Comfort

Significance	Trigger	Mitigation required?
Major Adverse	Conditions that were 'safe' in the baseline scenario become 'unsafe' as a result of the Proposed Development OR conditions that were 'suitable' in terms of comfort in the baseline scenario become 'unsuitable' as a result of the Proposed Development.	Yes
Moderate Adverse	Conditions that were 'suitable' in terms of comfort in the baseline scenario are made windier (by at least one comfort category) as a result of the Proposed Development but remain 'suitable' for the intended pedestrian activity.	No
Negligible	Conditions remain the same as in the baseline scenario.	No
Moderate Beneficial	Conditions that were 'unsuitable' in terms of comfort in the baseline scenario become 'suitable' as a result of the Proposed Development.	No
Major Beneficial	Conditions that were 'unsafe' in the baseline scenario become 'safe' as a result of the Proposed Development.	No

- 14.28. The wind microclimate conditions of on-Site receptors introduced as part of the Proposed Development has been assessed based on their level of adherence to the LDDC Lawson Criteria only. This is because the magnitude of change from a baseline position does not apply, as it does to an existing receptor since there is no true baseline. The criteria for determining the impact of the Proposed Development on the new receptors both for pedestrian comfort and safety within the Site are listed in Table 14.4.

Table 14.4 – Matrix for Determining the Introduced / On-Site Receptors Magnitude of Impact for Pedestrian Comfort

Significance	Trigger	Mitigation required?
Major Adverse	Conditions are 'unsafe'.	Yes
Moderate Adverse	Conditions are 'unsuitable' (in terms of comfort) for the intended pedestrian use.	Yes
Negligible	Conditions are 'suitable' for the intended pedestrian use.	No
Moderate Beneficial	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	No

Sensitive Receptors

- 14.29. The following sensitive receptors have been identified and assessed within the ES:
- All pedestrian circulation routes, building entrances, waiting areas (e.g., bus stops and pick-up/drop off points) and leisure open areas in the surrounding vicinity
 - All pedestrian circulation routes, building entrances, waiting areas (e.g., bus stops and pick-up/drop off points), leisure open areas and outdoor seating spaces within the Site
- 14.30. For on-Site receptors, any adverse effect is a 'significant effect' because it implies that a location, or area, has a wind microclimate that is unsuitable in terms of pedestrian safety and / or comfort for the desired use of that area. On this basis, effects that are adverse need mitigating.
- 14.31. For off-Site receptors, a major adverse effect is a 'significant effect' because it implies that a location, or area, which was previously suitable in terms of pedestrian comfort and / or safety, has become unsuitable for the desired use of that area. On this basis, only effects that are major adverse need mitigating.
- 14.32. Beneficial effects that are moderate or major in scale are not considered to be 'significant' or a material consideration for planning.
- 14.33. The wind assessment has been undertaken for a number of existing and introduced receptors at street level. The location of these receptors is shown in Figure 14.5 to Figure 14.11. The full list of receptors is included in Table 14.5. This list has been compiled within the context of Figure 2-4 of the Wind Microclimate Technical Report (Appendix 14.1, [1]) which identifies which areas are accessible at the elevated levels of Crown Street Phase 3.

Table 14.5 – List of Receptors for the Assessment

Receptor number	Description	Use	On-Site / Off-Site
1	Pavement (Owen St.)	Thoroughfare	Off-Site
2	Entrance (Deansgate Sq., North Tower)	Entrance	Off-Site
3	Amenity area (Deansgate Sq.)	Recreational space	Off-Site
4	Pavement (Owen St.)	Thoroughfare	Off-Site
5	Entrance (Deansgate Sq.)	Entrance	Off-Site
6	Entrance (Deansgate Sq.)	Entrance	Off-Site

Receptor number	Description	Use	On-Site / Off-Site
7	Pavement (Owen St. / Pond St.)	Thoroughfare	Off-Site
8	Pavement (Owen St. / Pond St.)	Thoroughfare	Off-Site
9	Pavement (Great Jackson St.)	Thoroughfare	Off-Site
10	Pavement (Great Jackson St.)	Thoroughfare	Off-Site
11	Pavement (Great Jackson St.)	Thoroughfare	On-Site
12	Entrance (Manchester Carers Forum)	Entrance	On-Site
13	Entrance (Bridgewater House)	Entrance	On-Site
14	Pavement (Chester Rd.)	Thoroughfare	Off-Site
15	Pavement (Silvercroft St.)	Thoroughfare	Off-Site
16	Amenity Area in front of Crown Street Phase 2	Recreational space	Off-Site
17	Pavement (Owen St. / Deansgate Sq.)	Thoroughfare	Off-Site
18	Pavement (Elisabeth Tower)	Thoroughfare	Off-Site
19	Amenity Area in front of Crown Street Phase 2	Recreational space	Off-Site
20	Entrance to Crown Street Phase 2	Entrance	Off-Site
21	Amenity Area in front of Crown Street Phase 2	Recreational space	Off-Site
22	Entrance (Elizabeth Tower)	Entrance	Off-Site
23	Entrance (Elizabeth Tower)	Entrance	Off-Site
24	Pavement to the West of GJS Plot F1	Thoroughfare	Off-Site
25	Private garden (GJS Plot F1)	Recreational space	Off-Site
26	Entrance (GJS Plot F1)	Entrance	Off-Site
27	Pavement to the South of GJS Plot F1	Thoroughfare	Off-Site
28	Entrance to the East of Crown Street Phase 3 (Ph. 3)	Entrance	On-Site
29	Entrance to the North of Crown Street Phase 3 (Ph. 3)	Entrance	On-Site
30	Entrance to the South of Crown Street Phase 3 (Ph. 4) / Amenity Area	Entrance	On-Site
31	Entrance to Crown Street Phase 3 (Ph.3 / Ph.2)	Entrance	On-Site
32	Entrance to the East of Crown Street Phase 3 (Ph. 4)	Entrance	On-Site
33	Entrance to the West of Crown Street Phase 3 (Ph. 3)	Entrance	On-Site

Receptor number	Description	Use	On-Site / Off-Site
34	Amenity area (ground level, Crown Street Phase 3)	Recreational space	On-Site
35	Entrance to the North of Crown Street Phase 3 (Ph. 2) / Amenity Area	Entrance	On-Site
36	Entrance to the North of Crown Street Phase 3 (Ph. 4)	Entrance	On-Site
37	Amenity area (ground level, Crown Street Phase 3)	Recreational space	On-Site
38	Entrance to Crown Street Phase 3 (Ph.4 / Ph.5)	Entrance	On-Site
39	Entrance to the East of Crown Street Phase 3 (Ph. 2)	Entrance	On-Site
40	Entrance to the North of Crown Street Phase 3 (Ph. 5)	Entrance	On-Site
41	Entrance to the East of Crown Street Phase 3 (Ph. 5)	Entrance	On-Site
42	Entrance to GJS Plot D (Ph. 1)	Thoroughfare	On-Site
43	Entrance to the East of GJS Plot D (Ph. 1)	Entrance	On-Site
44	Entrance to the West of GJS Plot D (Ph. 1)	Entrance	On-Site
45	Pavement between Ph. 1 and Ph. 6 of GJS Plot D	Thoroughfare	On-Site
46	Entrance to GJS Plot D (Ph. 6)	Entrance	On-Site
47	Entrance to the East of GJS Plot D (Ph. 6)	Entrance	On-Site
48	Entrance to the South of GJS Plot D (Ph. 6)	Entrance	On-Site
49	Drop-off area to the North of GJS Plot D (Ph. 1)	Entrance	On-Site
50	Pavement to the West of Crown Street Phase 3 (Ph. 4)	Thoroughfare	On-Site
51	Pavement to the West of Crown Street Phase 3 (Ph. 5)	Thoroughfare	On-Site
52	Entrance to Bridgwater House (East)	Entrance	Off-Site
53	Entrance to Bridgwater House (South)	Entrance	On-Site
54	School entrance (Crown Street Phase 2)	Entrance	On-Site
55	Entrance to GJS Plot G	Entrance	Off-Site
A	Entrance to Crown Street Phase 3, Ph. 4 (L2)	Entrance	On-Site
B	Amenity area (Crown Street Phase 3, Ph. 3, L2)	Recreational space	On-Site
C	Amenity area (Crown Street Phase 3, Ph. 3, L2)	Recreational space	On-Site
D	Entrance to Crown Street Phase 3, Ph. 3 (L2)	Entrance	On-Site
E	Amenity area between Ph. 4 and Ph. 5 of Crown Street Phase 3 (L2)	Recreational space	On-Site

Receptor number	Description	Use	On-Site / Off-Site
F	Entrance to Crown Street Phase 3, Ph. 5 (L2)	Entrance	On-Site
G	Amenity area (Crown Street Phase 3, Ph. 5, L2)	Recreational space	On-Site
H	Amenity area (Crown Street Phase 3, Ph. 2, L2)	Recreational space	On-Site
I	Entrance to Crown Street Phase 3, Ph. 2 (L2)	Entrance	On-Site
L	Amenity area between Ph. 2 and Ph. 3 of Crown Street Phase 3 (L2)	Recreational space	On-Site
J	Amenity area (GJS Plot D, Ph. 6, L1)	Recreational space	On-Site
K	Entrance to GJS Plot D, Ph. 6 (L1)	Recreational space	On-Site
L	Entrance to GJS Plot D, Ph. 1 (L4)	Entrance	On-Site

Baseline Conditions

Scenario 1

- 14.34. The Baseline has been modelled to represent the conditions in and around the Site within the existing context, prior to the introduction of the Proposed Development. The results are discussed below and further detail of the quantification of the results is provided in Section 3 of the Wind Microclimate Technical Report (Appendix 14.1, [1]).
- 14.35. In the Baseline scenario there are no exceedances of the pedestrian *safety* criteria.
- 14.36. In the Baseline scenario wind conditions across most of the receptors are suitable, in terms of comfort, for their intended pedestrian uses. Only one exceedance of the pedestrian comfort criteria occurs at receptor '6' (entrance to Deansgate Sq.); it should be noted that the canopies at this location have conservatively not been included in the CFD simulations. As these canopies were introduced to improve the wind comfort conditions at receptor '6', it is expected that the exceedance of the comfort criteria observed at this location would be resolved should the canopies have been modelled in the computer simulations. In terms of the amenity area to the North of Crown Street Phase 2, it should be noted that only the areas covered by receptor '19' and receptor '21' are suitable for 'sitting', while receptor '16' only meets the requirements for 'standing / short period of sitting'.

Identification and Evaluation of Likely Significant Effects

Demolition and Construction

- 14.37. A quantified assessment of the impacts of the Proposed Development during construction has not been included in this ES Chapter. As the construction of the buildings progresses, the temporary wind conditions within and in the vicinity of the Site of the Proposed Development are expected to gradually transition from the ones of the 'Baseline' to the ones presented in the subsequent sections of this ES Chapter.

Scenario 5

Pedestrian Safety Assessment

Receptors at ground level within the boundary of the Site

- 14.38. With the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4', there are no exceedances of the pedestrian *safety* criteria at ground level within the boundary of the Site. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

- 14.39. With the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4', at the elevated levels wind conditions are rated as *safe* for all users in accessible areas. The nature and scale of the effects for this receptor are **Negligible** and are therefore considered **Not Significant**.

Receptors at ground level within the areas surrounding the Site

- 14.40. Within the areas surrounding the Site, with the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' no exceedances of the pedestrian *safety* criteria were observed. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

Receptors at ground level within the boundary of the Site

- 14.41. In terms of pedestrian *comfort*, with the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' wind conditions across all street level receptors within the boundary of the Site are suitable for their intended pedestrian uses. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

- 14.42. With the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' wind conditions across the accessible areas of the podium level terraces are suitable – at worst – for 'standing / short period of sitting' during the summer months, except for a localised portion of the area covered by receptor 'B' ('Level 2' terrace of 'Phase 3') which only rate as suitable for 'walking' in summer. The nature and scale of the effects for this receptor are **Moderate Adverse** and are therefore considered to be **Significant**. It is understood that sitting areas across the various terraces will be positioned within areas that are at least suitable for 'standing / short period of sitting' in summer and that windier areas will be allocated to more active leisure activities (i.e., activities that are associated with 'standing / short period of sitting' or 'walking'). With this in mind, the nature and scale of the effects for receptor 'B' are expected to become **Negligible** and therefore considered **Not Significant**.

Receptors at ground level within the areas surrounding the Site

- 14.43. In terms of pedestrian comfort, with the introduction of 'Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' wind conditions across all street level receptors within the area surrounding the Site are suitable for their intended pedestrian uses (no changes to the wind conditions at receptors '6', '16', '19' and '21' previously highlighted have been recorded in this scenario). The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Scenario 7

Pedestrian Safety Assessment

Receptors at ground level within the boundary of the Site

- 14.44. With the introduction of 'Phase 5' and 'Phase 6' there are no exceedances of the pedestrian *safety* criteria at ground level within the boundary of the Site. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

- 14.45. With the introduction of 'Phase 5' and 'Phase 6', at the elevated levels wind conditions are rated as *safe* for all users in accessible areas. The nature and scale of the effects for this receptor are **Negligible** and are therefore considered **Not Significant**.

Receptors at ground level within the areas surrounding the Site

- 14.46. Within the areas surrounding the Site, with the introduction 'Phase 5' and 'Phase 6' no exceedances of the pedestrian *safety* criteria were observed. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

Receptors at ground level within the boundary of the Site

- 14.47. In terms of pedestrian *comfort*, with the introduction 'Phase 5' and 'Phase 6' wind conditions across all receptors at ground level within the boundary of the Site are suitable for their intended pedestrian uses. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

- 14.48. In terms of pedestrian *comfort*, with the introduction of 'Phase 5' and 'Phase 6' wind conditions across the accessible areas of the podium level terraces are suitable – at worst – for 'standing / short period of sitting' during the summer months, except for receptor 'H' ('Level 2' terrace of 'Phase 2'), and localised portions of the areas covered by receptor 'B' ('Level 2' terrace of 'Phase 3'), receptor 'E' ('Level 2' terrace between 'Phase 4' and 'Phase 5') and receptor 'G' ('Level 2' terrace of 'Phase 5') which only rate as suitable for 'walking' in summer. The nature and scale of the effects for these receptors are **Moderate Adverse** and are therefore considered to be **Significant**. It is understood that sitting areas across the various terraces will be positioned within areas that are at least suitable for 'standing / short period of sitting' in summer and that windier areas will be allocated to more active leisure activities. With this in mind, the nature and the scale of the effects for these receptors are expected to become **Negligible** and therefore considered **Not Significant**.
- 14.49. With the introduction of 'Phase 5' and 'Phase 6', wind conditions at receptor 'D' (entrance to 'Phase 3' on the 'Level 2' terrace) fall short of meeting the required level of wind *comfort* throughout the year. The nature and the scale of the effects for this receptor are **Moderate Adverse** and are therefore considered **Significant**.

Receptors at ground level within the areas surrounding the Site

- 14.50. In terms of pedestrian *comfort*, with the introduction of 'Phase 5' and 'Phase 6' wind conditions across all street level receptors within the area surrounding the Site are suitable for their intended pedestrian uses (no changes to the wind conditions at receptors '6', '16', '19' and '21' previously highlighted have been recorded in this scenario). The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Cumulative Effects

14.51. The committed developments that have been included in the cumulative assessment are listed in section 14.19.

Scenario 13

Pedestrian Safety Assessment

Receptors at ground level within the boundary of the Site

14.52. With the introduction of the committed developments there are no exceedances of the pedestrian *safety* criteria at ground level within the boundary of the Site. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

14.53. With the introduction of the committed developments, at the elevated levels wind conditions are rated as *safe* for all users in accessible areas. The nature and scale of the effects for this receptor are **Negligible** and are therefore considered **Not Significant**.

Receptors at ground level within the areas surrounding the Site

14.54. Within the areas surrounding the Site, with the introduction of the committed developments no exceedances of the pedestrian *safety* criteria were observed. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

Receptors at ground level within the boundary of the Site

14.55. In terms of pedestrian *comfort*, with the introduction of the committed developments wind conditions across all street level receptors within the boundary of the Site are suitable for their intended pedestrian uses. The nature and the scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Receptors at the elevated levels within the boundary of the Site

14.56. In terms of pedestrian *comfort*, with the introduction of the committed developments wind conditions across the accessible areas of the podium level terraces are suitable – at worst – for ‘standing / short period of sitting’ during the summer months, except for receptor ‘H’ (‘Level 2’ terrace of ‘Phase 2’) and localised portions of the areas covered by receptor ‘E’ (‘Level 2’ terrace between ‘Phase 4’ and ‘Phase 5’) and receptor ‘G’ (‘Level 2’ terrace of ‘Phase 5’), which only rate as suitable for ‘walking’ in summer. The nature and scale of the effects for these receptors are **Moderate Adverse** and are therefore considered to be **Significant**. It is understood that sitting areas across the various terraces will be positioned within areas that are at least suitable for ‘standing / short period of sitting’ in summer and that windier areas will be allocated to more active leisure activities. With this in mind, the nature and the scale of the effects for these receptors are expected to become **Negligible** and therefore considered **Not Significant**.

14.57. With the introduction of the committed developments, wind conditions and receptor ‘D’ (entrance to ‘Phase 3’ on the ‘Level 2’ terrace) fall short of meeting the required level of wind *comfort* throughout the year. The nature and the scale of the effects for this receptor are **Moderate Adverse** and are therefore considered **Significant**.

Receptors at ground level within the areas surrounding the Site

- 14.58. In terms of pedestrian comfort, with the introduction of the committed developments wind conditions across all street level receptors within the area surrounding the Site are suitable for their intended pedestrian uses (no changes to the wind conditions at receptors '6', '16', '19' and '21' previously highlighted have been recorded in this scenario). The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Mitigation Measures

- 14.59. Specialist wind engineering advice was provided right from the start of the design process: this allowed the wider design team to consider and take on board 'wind microclimate' input whilst the design was evolving. This process also allowed wind mitigation measures to become an integral part of the architectural and landscaping design of the Proposed Development: for this reason, the wind microclimate conditions within and in the vicinity of the Proposed Development have been presented with its embedded wind mitigation strategy in place. More details of the landscaping and mitigation plan are provided the Wind Microclimate Technical Report (Appendix 14.1, [1]).
- 14.60. It should be noted that, conservatively, no landscaping across the private terraces part of the Proposed Development has been considered in the wind simulations.
- 14.61. At receptor 'D' (entrance to 'Phase 3' on the 'Level 2' terrace), local shelter in the form of side screens is expected to be required to improve the wind comfort conditions at this particular location. With the introduction of this mitigation measure, the nature and the scale of the effects for this receptor in Scenario 7 and Scenario 13 are expected to become **Negligible** and therefore considered **Not Significant**.
- 14.62. It is understood that sitting areas across the various terraces within the Proposed Development will be positioned within areas that are at least suitable for 'standing / short period of sitting' in summer and that windier areas will be allocated to more active leisure activities.

Residual Effects

- 14.63. A quantified assessment of the impacts of the Proposed Development during construction has not been included in this ES Chapter. As the construction of the buildings progresses, the temporary wind conditions within and in the vicinity of the Site of the Proposed Development are expected to gradually transition from the ones of the 'Baseline' to the ones of Scenario 5, Scenario 7 and Scenario 13. In order to ensure that wind conditions are safe both within and in the vicinity of the Site of the Proposed Development, it will be vital that landscaping strategy and wind mitigation measures are delivered ahead of practical completion.
- 14.64. The completed Proposed Development ('Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' only) in the context of the existing surrounds (Scenario 5) - with the inclusion of wind mitigation measures at street level within the Site of the Proposed Development - results in residual effects that are **Negligible** and are therefore considered **Not Significant**.
- 14.65. The completed Proposed Development in the context of the existing surrounds (Scenario 7) - with the inclusion of wind mitigation measures at street level within the Site of the Proposed Development - results in residual effects that are **Negligible** and are therefore considered **Not Significant**.
- 14.66. The completed Proposed Development in the context of the cumulative surrounds (Scenario 13) - with the inclusion of wind mitigation measures at street level within the Site of the Proposed Development - results in residual effects that are **Negligible** and are therefore considered **Not Significant**.

Table 14.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects During the Construction Phase

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	-	None	-	Not Significant / Temporary

Table 14.7 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects During the Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' in existing surrounds, Scenario 5)				
Moderate Adverse	B	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing / short period of sitting' during the summer months	-	Not Significant / Permanent
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3', 'Phase 4', 'Phase 5' and 'Phase 6' in existing surrounds, Scenario 7)				
Moderate Adverse	B, E, G, H	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing / short period of sitting' during the summer months	-	Not Significant / Permanent
Moderate Adverse	D	Side Screens	-	Not Significant / Permanent
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3', 'Phase 4', 'Phase 5' and 'Phase 6' in cumulative surrounds, Scenario 13)				
Moderate Adverse	E, G, H	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing / short period of sitting' during the summer months	-	Not Significant / Permanent
Moderate Adverse	D	Side Screens	-	Not Significant / Permanent
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent

Reference List

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

- [1] Appendix 14.1 – Wind Microclimate Technical Report.
- [2] Lawson, T.V., "Building Aerodynamics". Imperial College Press, 2001
- [3] secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027
- [4] 'A position paper on experimental and computational methods in wind engineering' published by the UK Wind Engineering Society in 2022
- [5] www.cityoflondon.gov.uk/assets/Services-Environment/wind-microclimate-guidelines.pdf

15. Socio-Economic

Introduction

- 15.1. This Chapter of the ES has been prepared by Ekosgen and assesses the likely Socio-Economic 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.
- 15.2. The authors of the socio-economics input are Richard Weaver, Ross Mawhinney and Will Christiansen. Richard holds a BA (Hons) and PhD in Human Geography; he has 17 years' experience in economic development as a whole, and nine years' experience in undertaking a range of socio-economic assessments. Ross holds a BA (Hons) in Politics, Philosophy and Economics, and an MSc. In Leadership for Sustainable Development; he has four years' experience in economic development and undertaking socio-economic assessments and appraisals. Will holds a BSc Geography and an MSc Real Estate; he has almost six years' experience in economic development, and over four years' experience in preparing more than 25 EIA developments.

Assumptions and Limitations

- 15.3. There is not a recognised criteria for the assessment of socio-economic impacts, and therefore ekosgen, drawing on their expertise, knowledge of overarching guidance and experience of working in the subject area, have taken a structured approach to quantifying and assessing the scale and nature of potential impacts relative to baseline conditions. In cases where impacts could not be quantified, a qualitative judgement has been made, drawing on professional experience.
- 15.4. It should be noted that whilst some publicly available information on the proposed schemes established for calculating cumulative effects may include independent assessments of socio-economic effects, the approaches used are inevitably not all consistent. Therefore, to ensure a consistent approach in assessing baseline and cumulative schemes, information regarding the quantum of development proposed, by use, has been collated to enable a comparative assessment alongside the Proposed Development.
- 15.5. The most up to date data from official published sources has been used, however there are some limitations in the baseline data. Where this is the case, ekosgen have gathered data most closely aligning to the chosen Assessment Area and clearly stated what geography the data collected refers to.

Legislative and Policy Context, Guidance

- 15.6. This considers the national, sub-regional and local planning documents and policies of relevance to this Chapter.

Legislation

- 15.7. There is no relevant legislation that relates specifically to the Socio-economics discipline.

National Planning Policy

The National Planning Policy Framework (NPPF)

- 15.8. In July 2021, Government published a revised **National Planning Policy Framework (NPPF)**. The NPPF outlines the Government's planning policies for England and how these should be applied and "provides a framework within which locally-prepared plans for housing and other development can be produced".
- 15.9. The NPPF's overarching interdependent objectives outline how to achieve sustainable development:
- "a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*

b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

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

- 15.10. The NPPF also acknowledges the necessity to deliver a sufficient supply of homes, as well as highlighting the need to “ensure an integrated approach to considering the location of housing, economic uses and community facilities and services”.

Sub-Regional Planning policy (where relevant)

Draft Places for Everyone Plan

- 15.11. The emerging Places for Everyone Plan is the new long-term joint development plan for nine Greater Manchester districts. On 14 February 2022, the Plan and supporting documents were submitted to the Secretary of State for examination.
- 15.12. Once adopted, the Places for Everyone Plan will serve as a Development Plan Document, setting out the need to maximise the potential of Greater Manchester's key growth locations whilst also securing investment that raises the competitiveness of northern boroughs to deliver inclusive growth across the sub-region by ensuring that employment growth opportunities are well connected and accessible to all residents.
- 15.13. The Places for Everyone Plan also notes the importance that the “*growth potential of the Core Growth Area will continue through higher density development, building in opportunity areas, The Oxford Road Corridor, the existing office sectors, HS2 station proposals and improving the connections to other areas of Greater Manchester, which will assist growth within our boroughs*”. The Proposed Development supports the construction and purposing of higher density accommodation development and will contribute to the development of office space within the Core Growth Area.
- 15.14. The Plan establishes specific residential targets for the Greater Manchester area. Specifically, Policy JP-H1 sets out a need for 164,880 net additional dwelling over the period 2021-2037, with 56,528 of these being required within the Manchester city area.
- 15.15. With regards to density, the Plan specifies in Policy JP-H4 for that any new housing development “*should be delivered at a density appropriate to the location*” and with regards to the city centre, the appropriate level established is a minimum of 200 dwelling per hectare.
- 15.16. The Plan outlines the role of the City Centre as the most significant economic location in the country outside of London and the need for it to be strengthened significantly. There is a need for improvements in the public realm, walking and cycling facilities, and green infrastructure to help enhance the local character and environmental quality of the City Centre so that it can rival city centres across the globe. As part of this, and supported by the proposed development, is the need for “*a broad range of commercial accommodation [which] will be delivered, helping the City Centre to capture growth across key economic sectors*”. The proposed development will include additional commercial space which will contribute towards the goals of the Places for Everyone Plan, and the wider aims of the city region.
- 15.17. The Plan acknowledges that Greater Manchester has one of the strongest office markets in the country, with the scale and quality of its offering being vital to supporting strong and productive sectors such as digital/creative, and business, financial and professional services. Policy JP-J 3 of the Plan outlines that at least 1,900,000 sqm of accessible new office floorspace will be provided in the Plan area over the period 2021-2037.

The Greater Manchester Strategy – Our People, Our Place (2018)

- 15.18. The Greater Manchester Strategy – Our People, Our Place (2018) vision is to make Greater Manchester one of the best places in the world to grow up, get on and grow old.

- 15.19. Manchester has a key role to play in both the provision of jobs for a growing population and offering high-quality housing and commercial areas for this population. As part of this, the strategy outlines the need to “*see housing policy as just one part of a wider place-making approach along with education and skills, employment, transport, health, commercial development and public service reforms*”. The commercial, office and higher density accommodation outlined for the proposed development will all equally contribute to the fulfilment of the Our People, Our Place strategy.

Local Planning Policy

Manchester Core Strategy (2012)

- 15.20. The Manchester Core Strategy (2012) outlines the overall strategic direction for planning for Manchester over the plan period from 2012 to 2027 and aligns with national policies. The policies of the Core Strategy establish where major development and other forms of investment should be located in order to be sustainable, meet local needs and take full advantage of opportunities. A key spatial principle of the Core Strategy is that the regional centre of Manchester will be the focus for economic and commercial development, retail, leisure and cultural activity, alongside high-quality city living. In relation to the proposed development, relevant policies include:
- 15.21. Policy CC6 (City Centre High Density Development) sets out that “*City Centre development will generally be high-density to maximise land use efficiency.*”
- 15.22. Policy H1 (Overall Housing Provision) outlines the intentions to provide 60,000 new dwellings between March 2009 and March 2027, 16,500 of which are to be provided in the City Centre. It is noted that “*high density developments (over 75 units per hectare) are appropriate in both the City Centre and parts of the Regional Centre given the accessible location*” and that “*there will be a presumption towards high density housing development*” in City Centre areas.
- 15.23. Policy H5 (Central Manchester) states that priority for residential developments will be provided for family housing and other high value, high quality development where this can be sustained. The policy has an attached target to deliver 8,200 units in total by 2027, with 280 units per annum being required between 2021-2027.
- 15.24. Policy EN2 (Tall Buildings) sets out the permissible qualities for development of tall buildings, stating that they will be “*supported where it can be demonstrated that the buildings are of excellent design quality, appropriately located, contribute positively to sustainability and place making, and can bring significant regeneration benefits.*”
- 15.25. Policy EN11 (Quantity of Open Space, Sport and Recreation) establishes that Manchester City Council actively “*seek the provision of new open space, sport and recreation facilities, in particular where there is a quantitative shortage of use per head of population and where significant levels of development are proposed.*”

Guidance

Great Jackson Street Strategic Development Framework

- 15.26. The Site sits within the **Great Jackson Street Development Framework** character zone – a “high-density quarter of Manchester with a vibrant and sustainable mix of uses, whose economic viability is driven by ‘knowledge capital’.” The 2018 update to this Development Framework established the strategic objective of delivering high density, residential-led development to the character zone.

Residential Growth Strategy (2016)

- 15.27. Manchester City Council approved a Residential Growth Strategy in 2016, which seeks to deliver a minimum of 25,000 new homes in a ten-year period between 2016 and 2025. This policy framework aims to ensure that there is the right quality, mix and type of housing in the right locations to meet demand and changing demographics, develop neighbourhoods of choice and improve equality amongst the City’s residents in terms of housing choice, quality and affordability in order to develop strong communities.

- 15.28. The Strategy outlines how it will “support the delivery of residential-led development providing a significant number of high-quality homes alongside commercial development”. The proposed development provides both PBSA and commercial developments which will help to meet both increasing levels of demand for housing within the city whilst also creating new employment opportunities.

Assessment Methodology and Significance Criteria

- 15.29. Since there are no specific technical criteria to assess the significance of socio-economic effects, assessment will take place in accordance with the overarching EIA methodology (Chapter 2 of this ES) using professional judgement informed by experiences of similar projects.
- 15.30. The significance of socio-economic effects has broadly been determined by considering:
- The value of the resource (international, national, regional and local level importance);
 - The magnitude of the effect;
 - The duration of the effect;
 - The reversibility of the effect; and
 - The number of sensitive receptors.
- 15.31. The assessment is based on the phasing set out Chapter 1 of this ES. We have been asked to consider whether there will be any different environmental impacts if the delivery of ‘Phase 1 Plot D2 Office Building’ was to come later in the programme. We have considered this with regard to the socio-economic discipline and changes to the sequencing of ‘Phase 1 Plot D2 Office Building’ would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that we will be testing the development as a whole.
- 15.32. The magnitude of socio-economic impacts will be assessed in line with the approach outlined in Table 15.1. In addition to the magnitude, the duration of impact will also be taken into account with the impacts ranging from those that are likely to be temporary or permanent.

Table 15.1 – Methodology for Determining Impact Magnitude

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

- 15.33. The sensitivity of a receptor is based on the relative importance of the receptor using the framework outlined in Table 15.2.

Table 15.2 – Methodology for Determining Sensitivity

Sensitivity	Example 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.
Moderate	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 no local importance.

- 15.34. The significance of the impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The Impact Significance Matrix is set out in Table 15.3. All impacts assessed as ‘moderate’ or ‘major’ are considered to be ‘significant’ in EIA terms and are denoted with an asterisk.

Table 15.3 – Impact Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Substantial	Major *	Major *	Moderate *
Moderate	Major *	Moderate *	Minor
Minor	Moderate *	Minor	Negligible
Negligible	Minor	Negligible	Negligible

- 15.35. The nature of the effect has been described as either adverse or beneficial as follows:

- Beneficial – An advantageous effect to a receptor;
- Adverse – A detrimental effect to a receptor; and
- Neutral – An effect that is on balance both beneficial and adverse.

Scenarios Tested

- 15.36. This chapter of the ES will assess the impacts of the delivery of Scenario 7 (Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6) of the Proposed Development, as set out in Chapter 1 of this ES, as well as scenarios that explore cumulative impacts when including other committed and planned developments. This Scenario represents the complete development of Plot D2 Office (Phase 1), Crown Street Phase 3 Plot E2 (Phase 2), Crown Street Phase 3 Plot E1 (Phase 3), Crown Street Phase 3 Plot C8 (Phase 4), Crown Street Phase 3 Plot C7 (Phase 5), and Plot D1 Residential Tower (Phase 6) and the Scenario is addressed within the ‘Identification and Evaluation of Likely Significant Effects’ section below.

The Study Area

- 15.37. The approach to defining an appropriate study area has been informed by consideration of guidance on the topic. In respect of socio-economics, the relevant study area can vary according to different receptors; however, broadly, socio-economic impacts can be assessed with reference to a spectrum of spatial scales, ranging from the immediate local catchment through to the wider, sub-regional scale. The study area is also influenced by the availability of baseline data which may not always be available down to a local catchment area level.
- 15.38. In the case of the Proposed Development, the study area reflects the Site’s anticipated immediate local catchment. This can be defined using Lower Super Output Areas (LSOA) and the Site sits within the Manchester 060D LSOA, however there is limited availability of relevant data at the LSOA geography level to account for the socio-economic receptors assessed in this Chapter. Therefore, it is assessed that for most receptors the Manchester City Council local authority area represents the appropriate geography over which to assess socio-economic effects. This district/borough level approach reflects a geography at which there are consistently available socio-economic data within the public domain and therefore facilitates benchmarking and assessment.
- 15.39. For some receptors a smaller study area is required; for instance, with respect to the demand for social and community infrastructure within close proximity to the Proposed Development (i.e. within a certain distance radius from the Site).
- 15.40. Wherever possible, the baseline characteristics of the study area will be benchmarked against comparators at the sub-regional (Greater Manchester), regional (North West) and national levels.

Baseline Conditions

- 15.41. The purpose of this section is to establish an understanding of the baseline conditions to inform the context for intervention and therefore the potential impact of the Proposed Development on local characteristics. A range of published data sources has been considered to understand both the social and economic characteristics of the area as a starting point for the assessment.
- 15.42. For the purpose of establishing the baseline, the local assessment Area has been defined to reflect the anticipated catchment of the Proposed Development, which for the majority of socio-economic receptors constitutes the relevant local authority / borough (in this case, Manchester City Council). This also reflects a geography at which there is consistently available socio-economic data within the public domain that can be accessed to establish the baseline position and readily compare to benchmark areas, such as the sub-regional (Greater Manchester), regional (North West) and national levels.
- 15.43. In some instances, alternative assessment areas have been considered, for example when considering the capacity of local primary healthcare facilities. These are typically based on a distance or journey time from the Site and the rationale for the distance chosen is set out in the relevant sections below.
- 15.44. It should be noted that construction has begun on Plot 11 First Street, a development that had been included as a cumulative Committed Development in the Scoping Document prepared for the Proposed Development and therefore should technically be considered a baseline Committed Development. Inclusion of Plot 11 First Street in the baseline scenario, however, makes no material change to the conclusions of the socio-economic assessment as the impact assessment does not consider baseline schemes in the assessment of impact. Any changes to receptor sensitivity as a result of including Plot 11 First Street as a baseline scheme rather than a cumulative scheme are negligible and therefore can be discounted.
- 15.45. Study area baseline conditions are presented in Table 15.4. These are summarised by those most relevant to each socio-economic receptor.

Table 15.4 Baseline Conditions

Receptor	Baseline
Individuals seeking construction employment and the local economy (through GVA)	Assessment area: Borough level (Manchester). Manchester has a lower proportion of employment in the construction sector (2.6%) than Greater Manchester (5.4%), the North West (5.5%) and nationally (4.9%) (BRES, 2021). The sector is therefore underrepresented locally. Latest labour market indicators suggest that Manchester's unemployment rate is notably higher (8.9%) than comparator areas (Greater Manchester, 5.1%; North West, 4.7%) (APS, 2021). Similarly, the proportion of the working age population that are claimants (claimant rate) is higher in Manchester (5.7%) compared to Greater Manchester (4.9%) and the North West (4.2%). In Manchester, there are currently (October 2022) 22,310 people claiming Universal Credit (UC) or Job Seeker's Allowance (JSA) (ONS Claimant Count, 2022). All sector productivity (as measured by GVA per FTE) is lower in Manchester (c. £78,000) compared to the national average (c. £83,000). However, this level is above the Greater Manchester (c. £70,000) and North West (c. £71,000) averages (ONS, 2019; BRES, 2019). Productivity in the construction sector is in the order of £116,000 per FTE – this is notably higher than all comparator areas, including the national average (c. £100,000) (ONS, 2019; BRES, 2019). Receptor sensitivity to change is assessed as being 'moderate'.
Individuals seeking employment and the local economy (through GVA)	Assessment area: Borough level (Manchester). General labour market indicators as above. Manchester has a higher share of employment within sectors that broadly reflect the office-based service economy – constituting broad industrial groups: J: Information and communication; K: Financial and insurance activities; L: Real estate activities; M: Professional, scientific and technical activities; and N: Administrative and support service activities. These sectors account for 37% of employment, compared to Greater Manchester (29%), the North West (25%) and nationally (28%) (BRES, 2021). Manchester has a lower proportion of employment (22%) in retail, leisure and hospitality sectors (defined as Retail, Accommodation & food services and Arts, entertainment, recreation & other services) compared to the national and regional averages (26%) (BRES, 2021). All sector productivity as presented above. Productivity (as measured by GVA per FTE) in 'service activity' sectors (as previously defined) is lower in Manchester (c. £99,000) than the national average (c. £112,000) but higher than sub-regional and regional comparators (ONS, 2019; BRES, 2019). Productivity in retail, leisure and hospitality sectors (defined as Broad Industrial Groups G, I, R, S, T and U (Retail, Accommodation & food services and Arts, entertainment, recreation & other services) is higher in Manchester (c.£44,000) than comparator areas, including the national average (c.£40,000) (ONS, 2019; BRES, 2019). Receptor sensitivity to change is assessed as being 'moderate'.

Receptor	Baseline
Local economy (through GVA)	Assessment area: Borough level (Manchester). Latest general labour market indicators as above Manchester has a lower proportion of employment (22%) in retail, leisure and hospitality sectors (defined as Retail, Accommodation & food services and Arts, entertainment, recreation & other services) compared to the national and regional averages (26%) (BRES, 2021). All sector productivity as above (lower than national average, but above Greater Manchester and the North West) (ONS, 2019; BRES, 2019). Productivity in retail, leisure and hospitality sectors (defined as Broad Industrial Groups G, I, R, S, T and U (Retail, Accommodation & food services and Arts, entertainment, recreation & other services) is higher in Manchester (c.£44,000) than comparator areas, including the national average (c.£40,000) (ONS Regional Gross Value Added (balanced) by industry) Receptor sensitivity is assessed as being 'moderate'.
Primary healthcare facilities	Assessment area: local/neighbourhood level (within 1 mile of the Site). Within 1 mile of the Site there are eight GP practices operating across the NHS Salford Clinical Commissioning Group (CCG) and NHS Manchester CCG areas. The closest practices to the Site are The Arch Medical Practice and Cornbrook Medical Practice (both 0.4 miles) which are currently operating at patient to FTE GP ratios of 1508:1 and 2141:1 respectively. Other practices within the 1 mile assessment area have higher ratios, with Blackfriars Medical Practice (0.8 miles) operating at a patient to FTE GP ratio of 7,005:1. Recognising that different practices have varied operational and staffing requirements to suit the needs of their patient population, the ratio of the closest Site The Arch Medical Practice is in line with the commonly accepted benchmark ratio used in healthcare planning and recommended by the HUDU (1,800 patients per FTE GP), however Cornbrook Medical Practice is significantly above this level. The Arch Medical Practice, Cornbrook Medical Practice, The Docs, Trinity Medical Centre, Langworthy Medical Practice, the Limelight Health and Wellbeing Hub, Blackfriars and The City Health Centre are all located within 1 mile of the Site. In combination, there are 106,934 registered patients and just under 55 FTE GPs – operating at a ratio of 1,956 patients per GP. A new build medical centre is to be provided at the ground and first floor of the Elizabeth Tower residential development within the Great Jackson Street Strategic Regeneration Framework area. It is understood that this facility is likely to be operational within 2023. It is understood the new centre will include 16 clinical rooms and could support a patient population in the order of 20,000. The proposed FTE GP staffing arrangements are not known. Although unable to quantify, this additional provision would contribute to the alleviation of the current shortfall in the assessment area (as measured by the patient to FTE GP ratio). In terms of local dental service provision, there are 9 Dental practices located within 1 mile of the Site, the nearest of which is 207 Dental Care, located 0.5 miles away. Receptor sensitivity is assessed as being 'moderate'.
Open space and recreational facilities and their users	The Plot C and E Site bound by Silvercroft Street and Owen Street Car Park to the north, Melbourne Street and Plot F to the south, Owen Street and Deansgate Square to the east, under construction Crown Street Phase 2 to the west. The Plot D Site is bounded by Great Jackson Street to the northeast, the A57(M) Mancunian Way to the South, Melbourne Street to the northwest, public footpath to the east. There are a number of leisure facilities, including gyms / health clubs and sport centres within the vicinity of the Site. The nearest leisure centre to the Site is Sugden Sports Centre, less than a 20-minute walk away. There a number of other recreational Sites within walking distance of the Site, including Hulme Park and All Saints Park. Being a city centre Site there are numerous leisure sites within close proximity to the Site, including HOME cinema, Odeon Cinema, Junkyard Crazy Golf. As well as this, it is a close walk into the rest of the city centre, the Deansgate tram station is within a 5-minute walk from the Site and Manchester Oxford Road railway station is within a 13-minute walk from the Site, providing easy access to the wider city. There are a number of open / amenity spaces in proximity (within 1 mile) to the Site, including Hulme Park (4.88ha), All Saints Park (0.75ha), Castlefield Urban Heritage Park (0.81ha), St John's Gardens (0.5ha), and Sackville Garden (0.5ha). A City Wide Open Space Sport and Recreation Study (undertaken in 2009) highlighted that a priority for the City is for better quality and improved access for its open space, sport and recreation facilities. Receptor sensitivity is assessed as being 'moderate'.
Reduction in Crime and Fear of Crime	Assessment area: local (within 500m of Site) Due to data availability, the study area is restricted to within 500m of the proposed development Site, as defined by Greater Manchester Police's boundaries. Between February 2022 and January 2023 there were 1,447 reported crimes in total in the study area. This is described by Greater Manchester Police as "relatively high." The most common type of reported crimes in the study area were relating to less serious wounding (47.3% of all recorded crimes), theft from a motor vehicle (16.7%) and theft (12.9%). The crime data available offers a localised breakdown of crime rates per 1,000 dwellings compared to Manchester City, Greater Manchester and England & Wales levels. The rates reported for the Site are significantly lower with respect to domestic burglaries (61% lower than Manchester City, 50% lower than Greater Manchester and 49% lower than England & Wales), woundings (54% lower than Manchester City, 37% lower than Greater Manchester but 20% higher than England & Wales) and criminal damage (57% lower than Manchester City, 43% lower than Greater Manchester and 31% lower than England & Wales), but it should be noted that the rate of incidents of vehicle crime is proportionally higher than all three comparative areas (13% than Manchester City, 86% higher than Greater Manchester). Receptor sensitivity is assessed as being 'moderate'.

Identification and Evaluation of Likely Significant Effects

- 15.46. A desktop review of the committed baseline and cumulative schemes has been undertaken. The review has focused on documents that are in the public domain through the Manchester City Council planning application portal and as such it is not possible in every instance to obtain full scheme details. It should be noted that whilst some publicly available information on the proposed schemes may include independent assessments of socio-economic effects, the approaches used are inevitably not all consistent. Therefore, to ensure a consistent approach in assessing baseline and cumulative schemes, information regarding the quantum of development proposed, by use, has been collated to enable a comparative assessment alongside the Proposed Development. The limitations of this approach are recognised, however, it provides a proportionate approach that allows for an evaluation of the likely significance of socio-economic effects of the Proposed Development when considered in conjunction with committed baseline and cumulative schemes.
- 15.47. The section below summarises the construction and operational phase socio-economic effects in relation to **Scenario 7**. For the purposes of this assessment this is referred to as the core scheme, including committed baseline schemes but excluding cumulative schemes which are considered in a later section. This excludes cumulative elements (Scenario 13) which are evaluated in a later section.

Construction Phase

- 15.48. Construction phase impacts are considered to be temporary (all scenarios) and are assessed below:

Table 15.5: Construction Phase Impacts

Receptors affected	Receptor Sensitivity	Description of Impact	Magnitude of Impact	Scale of Effect and Significance
Individuals seeking construction employment and the local economy (through GVA)	Moderate	The estimated construction spend associated with the Proposed Development will support a temporary economic uplift during the construction period. The level of investment proposed has the potential to support an estimated 7,615 construction job years, equivalent to 923 full time equivalent (FTE) jobs per year across the duration of the build, based on the average turnover per FTE in Manchester for the construction sector (BRES, 2019; ABS, 2019). The number of construction workers is likely to fluctuate over the duration of the construction programme to reflect the stage of development reached and associated workforce requirements. Although regional and national construction firms will often use their own workers on development schemes, it is common for at least some contractors to be drawn from the immediate local area. A local labour agreement would support the capture of local benefits. A leakage allowance is applied at 25% (medium, in accordance with HCA Additionality Guide, 2014), owing to the assessment area's high unemployment and claimant rate relative to comparator areas, and balanced against the possibility that many employment seeking residents locally may not have the appropriate skills profile to access skilled construction sector employment. Given construction sector underrepresentation locally, the likelihood of construction employment being displaced is higher. A 'medium' displacement allowance of 50% is applied. The total net direct employment is therefore estimated at 346 FTE. These jobs will generate GVA of £42.7m per annum over the construction period, estimated by applying the average GVA per FTE for the Manchester construction sector (ONS, 2019; BRES, 2019). This constitutes 4.9% of the total construction sector GVA in the study area. Multiplier effects as a result of spill-over spending through the supply chain (indirect impacts) and through knock-on consumer spending as a	<i>Scenario 7: Moderate beneficial*</i>	<i>Scenario 7: Temporary, Moderate beneficial*</i>

Receptors affected	Receptor Sensitivity	Description of Impact	Magnitude of Impact	Scale of Effect and Significance
		result of wages being derived or spent locally (the induced impacts) will generate further employment during the construction phase. Applying the HCA Additionality Guidance sub-regional multiplier for regeneration and physical infrastructure projects suggests that the estimated total direct, indirect and induced employment could be in the order of 460 FTEs. This constitutes 6.2% of the total construction sector employment in the study area. Within the context of the above, it is assessed that Scenario 7 represents a moderately beneficial magnitude of impact.		

Operational Phase

15.49. All operational phase impacts are permanent and are assessed below:

Table 15.6: Operational Phase Impacts

Receptors effected	Receptor Sensitivity	Description of Impact	Magnitude of Impact	Scale of Effect and Significance
Individuals seeking employment and the local economy (through GVA)	Moderate	It is understood that the Site does not provide any existing employment. Through the application of relevant (retail/leisure and corporate/professional services/public sector/TMT/finance and insurance) employment densities to the proposed floorspace (HCA, 2015), and assuming 100% occupancy, Scenario 7 could provide floorspace to accommodate approximately 295 gross direct FTE jobs. Notwithstanding the limitations with this approach, this represents an upper limit of gross employment generation for the purposes of this exercise. Due to the nature of proposed employment and the location of the Site, it is considered that leakage is likely to be low. A 'low' leakage allowance (10%) is applied. The likelihood of the intervention displacing existing employment activity within the assessment area is considered to be reasonably high. For the purposes of this assessment, it is assumed that 50% of activity will be displaced ('medium' displacement). The total net direct employment is therefore estimated at approximately 133 FTEs. These jobs could generate GVA of £10.7m per annum. Multiplier effects as a result of spill-over spending through the supply chain (indirect impacts) and through knock-on consumer spending as a result of wages being derived or spent locally (the induced impacts) will generate further employment. Applying the HCA Additionality Guidance local area composite multiplier for office uses suggests that the estimated total direct, indirect and induced employment could be in the order of 201 FTEs. It is assessed that the level of employment (and associated GVA uplift) constitutes a negligible magnitude of impact.	<i>Scenario 7: Negligible</i>	<i>Scenario 7: Permanent, Negligible</i>
Local economy (through GVA)	Moderate	Additional expenditure from residents living within the Proposed Development will contribute towards an uplift in local expenditure in retail, leisure and hospitality sectors. Household spending levels are benchmarked according to data from the ONS Household Projections for England (2019). This benchmark reflects average expenditure, excluding housing/accommodation costs. It is assumed that expenditure displacement will be medium (50%) and leakage will be medium (50%), accounting for a degree of geographic mobility of residents. This generates an estimated total annual net expenditure of c.£10.4m. This uplift in spending has the potential to support employment within local shops and services, broadly within retail, leisure and hospitality sectors.	<i>Scenario 7: Negligible</i>	<i>Scenario 7: Permanent, Negligible</i>

Receptors effected	Receptor Sensitivity	Description of Impact	Magnitude of Impact	Scale of Effect and Significance
		The application of a turnover per FTE benchmark for retail, leisure and hospitality sectors (ABS, 2019; BRES, 2019) to the uplift in annual expenditure indicates that this could support a moderate amount of employment (estimated at 92 FTE jobs). This employment would support a modest uplift in GVA. The magnitude of impact is considered to be negligible.		
Primary healthcare facilities	Moderate	The increase in population could lead to added pressure on existing primary healthcare facilities. Primary healthcare facilities for the general resident population are currently subject to higher demand pressures than the target ratio of 1,800 patients to FTE GP (currently 1,956 patients per FTE GP). As such, the addition of 2,401 residential units to the local area would lead to increased pressures, with an adjusted ratio of 2,063 patients per FTE GP when taking into consideration the average household size in Manchester (ONS Household Projections for England (2019)). To meet the benchmark ratio in the assessment area, accounting for the Proposed Development, an additional 8 FTE GPs could be needed. This quantitative approach does not take account of the variety of operational and staffing requirements that practices employ to suit the needs of their patient population, meaning that it is feasible that certain practices will operate sustainably at levels above and below the benchmark ratio of patients per GP. It should also be noted that a new build medical centre is to be provided at the ground and first floor of the Elizabeth Tower residential development within the Great Jackson Street Strategic Regeneration Framework area, as part of an earlier phase that is coming on stream this year. Whilst it is not currently possible to quantify its impact, it is reasonable to assume that it will contribute to the alleviation of existing demand pressures plus accommodate new residents from proposed development. As such, receptor sensitivity for primary healthcare facilities is considered to be moderate while the magnitude of impact of the Proposed Development is assessed as a minor adverse impact.	<i>Scenario 7: Minor Adverse</i>	<i>Scenario 7: Permanent, Minor Adverse</i>
Open space and recreational facilities and their users	Moderate	An uplift in resident population as a result of Scenario 7 will increase demand and usage of nearby open space and recreation facilities. A number of open green spaces and parks have been identified within close proximity to the Site as well as an array of leisure and recreational facilities, given the city centre location. Due to limited information availability, and an absence of up to date open space provision benchmarks for Manchester City Council (most recent available standards relate to work undertaken in 2009 and therefore are unlikely to accurately reflect the current balance of provision) it is not possible to accurately quantify the extent to which this increased population will affect the existing balance of provision of open space and recreational facilities across the assessment area. It is also considered likely that many (if not all) of the committed baseline schemes will include elements that either add to the provision, or improve access to existing provision, in line with planning requirements to enhance public realm, landscaping etc. Given the scale of increase in population, it is considered reasonable that this would place greater demand on the usage of local provision. However, this needs to be balanced against the new quality provision and improved access to existing provision, alongside the wide array of leisure and amenity facilities located within the assessment area. Given this existing provision, as well as the development of new open spaces and public realm associated with the Development and other baseline developments, on balance therefore the magnitude of change is assessed as a minor beneficial impact.	<i>Scenario 7: Minor Beneficial</i>	<i>Scenario 7: Permanent, Minor Beneficial</i>
Reduction in Crime and Fear of Crime	Moderate	While an increased residential population across the application Site as a whole could present greater opportunities for crime, the inclusion of high quality public realm and open space would help to mitigate this risk. The inclusion of 'Secured by Design' standards would also help to	<i>Scenario 7: Minor Beneficial</i>	<i>Scenario 7: Permanent, Minor Beneficial</i>

Receptors affected	Receptor Sensitivity	Description of Impact	Magnitude of Impact	Scale of Effect and Significance
		mitigate this risk, although given the outline nature of the scheme, precise details would need to be confirmed at a reserved matters stage. Set against the “relatively high” existing baseline levels of crime reported within the study area by Greater Manchester Police from February 2022 to January 2023,, the proposed development offers the opportunity to contribute towards reducing levels of crime per head of population within the Manchester area which are currently high when compared to the national and Greater Manchester averages. Generic interventions in relation to scheme design and open space/public realm are considered to result in a small magnitude of change and therefore result in a permanent minor beneficial effect across the study area which is considered to be not significant.		

Cumulative Effects

15.50. A review of the cumulative schemes identified indicates that these schemes collectively will deliver:

- c. 5,200 residential units;
- c. 1,800 student bedspaces;
- c. 107,000 sq.m of commercial (broadly office) floorspace; and
- c. 15,000 sq.m of retail, food and beverage floorspace.

15.51. The delivery of these schemes has the potential to interact cumulatively with the Proposed Development. Tables 15.7 and 15.8 summarise the significance of cumulative impacts associated with the “worst-case” scenario (i.e. Scenario 13: Scenario 7 + cumulative effects), by construction and operational phases. As above, all construction impacts are considered to be temporary and operational impacts are considered to be permanent.

Table 15.7: Cumulative impacts – construction phase

Receptors affected	Description of Impact	Scale of Effect and Significance
Individuals seeking construction employment and the local economy (through GVA)	It is possible that the construction phases of all of the cumulative schemes could overlap with that of the Proposed Development. Based on the information that is publicly available, it is not possible to accurately quantify the additional construction employment alongside the timeframe over which it is likely to be generated; however, it is reasonable to suggest that the delivery of these schemes could lead to some competition for construction employment within the study area. As indicated within the assessment (Table 15.5), the local construction sector is underrepresented. Assuming that the delivery of the cumulative schemes would not all coincide, it is reasonable to suggest that the sector locally may need to recruit at least some construction labour from outside of the study area. In addition, with the likely overlap in construction phases of the cumulative schemes there is potential for apprentices to move between schemes and complete their apprenticeships within the local authority. These are particularly beneficial as many apprenticeships require a three-year duration which can be difficult to achieve on shorter duration build projects. Therefore, alongside the potential for additional construction employment, having overlapping projects within the study area is considered to be beneficial and moderate magnitude of impact.	<i>Scenario 13: Temporary, Moderate Beneficial*</i>

Table 15.8: Cumulative impacts – operational phase

Receptors affected	Description of Impact	Scale of Effect and Significance
Individuals seeking employment and the local economy (through GVA)	The relevant cumulative schemes would generate additional operational employment that would be complementary to the proposed uses of commercial space proposed in Phases 2 to 6 (Scenarios 9 to 13). Based upon the application of assumptions consistent with those set out in Table 15.6 the scale of increase would represent a minor magnitude of impact.	<i>Scenario 13: Permanent, Minor Beneficial</i>
Local economy (through GVA)	Alongside the Proposed Development, the resident expenditure derived from the cumulative schemes will deliver an uplift in spending within the local economy. The scale of this uplift, relative to the existing baseline, however, is of a minor magnitude of impact.	<i>Scenario 13: Permanent, Minor Beneficial</i>
Primary healthcare facilities	Alongside the Proposed Development, the cumulative schemes will lead to an additional demand for primary healthcare services. It should, however, be noted that a distinction is made between primary healthcare receptors for the local resident population and the student population (the latter can be served by specific university provision that is not available to the wider non-student population). The delivery, therefore, of approximately 5,200 residential units (and the ensuing uplift in local population) could therefore exacerbate an existing shortfall in provision (see Table 15.5) and could constitute a minor magnitude of impact. It is assumed that these schemes would seek to mitigate any potential adverse effects through the planning system.	<i>Scenario 13: Permanent, Minor Adverse</i>
Open space and recreational facilities and their users	It is considered that collectively the cumulative schemes would bring forward new open space and recreational leisure facilities in the study area through provision on-site. It is assumed that these will, at least, serve the increased demand derived from each scheme individually and have the potential to generate beneficial effects. There is also the potential for cumulative schemes to positively interact with the Proposed Development by way of providing linkages to open spaces and recreational facilities. When taken in tandem with the potential development of open spaces and connecting associated public realm assessed across both baseline and cumulative schemes, the potential provision associated with this can have a beneficial, albeit minor, impact.	<i>Scenario 13: Permanent, Minor Beneficial</i>
Reduction in Crime and Fear of Crime	With an increased residential population across both the Proposed Development and the cumulative schemes, there are greater opportunities for crime presented, however an increase in provision for high quality public realm and open space would help to mitigate this risk. ‘Secured by Design’ standards will have been applied to both the Proposed Development and cumulative schemes, which would also help to mitigate this risk. Set against the “relatively high” existing baseline levels of crime reported within the study area by Greater Manchester Police from February 2022 to January 2023, the proposed development offers the opportunity to contribute towards reducing levels of crime per head of population within the Manchester area which are currently high when compared to the national and Greater Manchester averages. Generic interventions in relation to scheme design and open space/public realm are considered to result in a minor magnitude of change and therefore result in a permanent minor beneficial effect across the study area which is considered to be not significant.	<i>Scenario 13: Permanent, Minor Beneficial</i>

Mitigation Measures

15.52. As indicated in Tables 15.5, 15.6, 15.7 and 15.8, there are no significant adverse effects identified.

Residual Effects

- 15.53. Since no mitigation measures are recommended, Tables 15.9 and 15.10 summarise the residual effects for all receptors, summarised for each of the baseline and cumulative scenarios.
- 15.54. Residual effects marked with an asterisk are assessed as being 'significant' in environmental impact assessment terms.

Table 15.9 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Duration (i.e., Temporary/Permanent)	Residual Effect – Significance and
Construction Phase					
Uplift in local construction employment	Individuals seeking construction employment and the local economy (through GVA)	None	n/a	Scenario 7	Temporary, Moderate Beneficial*
				Scenario 13	Temporary, Moderate Beneficial*

Table 15.10 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)	
Operational Phase					
Net change in operational employment (and change in GVA)	Individuals seeking construction employment and the local economy (through GVA)	None	n/a	Scenario 7	Permanent, Negligible
				Scenario 13	Permanent, Minor Beneficial
Uplift in local household spend, increasing local expenditure, including on retail, household goods, food and drink, local transport, recreation and leisure	Local economy (through GVA)	None	n/a	Scenario 7	Permanent, Negligible
				Scenario 13	Permanent, Minor Beneficial

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)	
and other expenditure likely to be spent locally.					
Additional demand for healthcare facilities (GP services and dentists) as a result of the uplift in population.	Primary healthcare facilities	None	n/a	Scenario 7	Permanent, Minor Adverse
				Scenario 13	Permanent, Minor Adverse
Additional demand for the use of the existing leisure facilities and open/amenity space	Open space and recreational facilities and their users	None	n/a	Scenario 7	Permanent, Minor Beneficial
				Scenario 13	Permanent, Minor Beneficial
A reduction in crime as a result of 'Secured by Design'	Reduction in Crime and Fear of Crime	None	n/a	Scenario 7	Permanent, Minor Beneficial
				Scenario 13	Permanent, Minor Beneficial

Reference List

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

- English Partnerships (2008), Additonality Guide – A Standard Approach to Assessing the Additional Impacts of Interventions, 3rd Edition
- Homes and Communities Agency (HCA) (2014) Additonality Guide, 4th Edition
- Homes and Communities Agency (HCA) (2015) Employment Density Guide, 3rd Edition
- ONS (2020) Sub National Population Projections (2018 based) - local authority based by single year of age
- ONS (2022) Usual resident population, 2011 and 2021 and percentage change between 2011 and 2021
- ONS Annual Business Survey (2019); ONS Business Register and Employment Survey (2019)
- ONS Annual Population Survey (2021)
- ONS Business Register and Employment Survey (2021)
- ONS Claimant Count (2022)
- ONS Regional gross value added (balanced) by industry: local authorities by ITL1 region (2019); ONS Business Register and Employment Survey (2019)
- Greater Manchester Police (2023) Crime Impact Statements for Great Jackson Street
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16. Residual Impacts

Air Quality

Table 16.1 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Air Quality)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect
Construction Phase				
Minor adverse effects from fugitive dust releases on human health and amenity	Existing Human Receptor Locations	Error! Reference source not found. - the Proposed Development will incorporate the specific construction phase mitigation measures outlined in the IAQM guidance.	Implementation of recommended measures within a Construction Dust Management Plan (DMP) or Construction Environmental Management Plan (CEMP)	Negligible effects to property and people on a temporary basis
Minor adverse effects from road traffic emissions on human health	Existing Residential	Sustainable construction phase travel plan to reduce HGV movements during construction		Minor Adverse effects upon existing sensitive uses on a temporary basis

Table 16.2 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Air Quality)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect
Operational Phase				
Negligible effects from existing road traffic emissions on human health	Proposed Human Residential Receptors	Not required	Not required	Negligible effects to future residents on a permanent basis
Minor adverse from additional road traffic emissions generated by the Proposed Development on human health	Existing Human Receptor Locations	Section 6.123 to 6.126: Proposed Development will consider a significant level of offsetting measures in the form of sustainable transport principles. The provision of EVC charging facilities (up to 20% provision demand led basis) as well as cycle parking facilities	Operational Mitigation Strategy	Negligible impact upon existing sensitive uses on a permanent basis

Climate Change

Table 16.3 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Climate Change)

Likely Significant Effect	Receptor(s)	Significance	Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Whole Life Embodied emissions (incl. construction transport)	Global Climate (Sensitivity: High)	Minor adverse	Consideration should be given to the robustness and durability of materials and assets and their lifetime replacement cycles. Consideration during later design stages where possible should also be given to the Circular Economy principles recommended by GLA in the Circular Economy Statement Guidance Further optimisation of the construction transport schedule along with procurement of local materials to be further explored in later design stages, where possible.	Negligible (Permanent)

Table 16.4 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Climate Change)

Likely Significant Effect	Receptor(s)	Significance	Mitigation Measure	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Building emissions	Global Climate (Sensitivity: High)	Minor Adverse	Procurement of energy efficient equipment and, Robust monitoring of energy consumption (i.e., smart metering)	Negligible (Permanent)
Operational Transport emissions	Global Climate (Sensitivity: High)	Major - Moderate Adverse	Proposed additional mitigation measures includes the initiatives proposed in the Transport Assessment submitted in support of the planning application, to encourage people to travel to the Proposed Development in a sustainable manner.	Moderate-Minor Adverse (Permanent)

Daylight, Sunlight and Overshadowing

Table 16.7 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Daylight, Sunlight and Overshadowing)

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				
Reductions in daylight	Scoped out	-	--	-
Reductions in sunlight	Scoped out	-	--	-
Increased overshadowing	Scoped out	-	--	-

Table 16.8 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Daylight, Sunlight and Overshadowing)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Reductions in daylight	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Reductions in sunlight	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Increased overshadowing	Surrounding residential properties	None required	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)

Noise and Vibration

Table 16.9 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Noise and Vibration)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Negligible to moderate adverse construction noise	Local residents	Para. 9.99 & 9.99 of Chapter 9: Solid screening around Site. Communication with City Council and local residents. Application of 'Best Practicable Means' with regard to noise control	Negligible to minor adverse construction noise effects

Table 16.10 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Noise and Vibration)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Operational Phase			
Negligible building services plant noise effects	Residential properties	Para. 9.91 of ES Chapter 9: Adherence to environmental noise limits for plant	Negligible building services plant noise effects
Increase in road traffic noise on local roads	Residential properties	-	Negligible
Negligible activity noise effects from amenity space and commercial units	Residential properties	Para. 9.96 of ES Chapter 9: Adherence to environmental noise limits for amenity spaces and commercial units	Negligible activity noise effects from amenity spaces and commercial units

Human Health

Table 16.11 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Human Health)
Significant Receptors listed as identified from each technical chapter and as relevant according to those presented in paragraph 9.42 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases.

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				
Employment & Economy	Workers; local economy	None required	N/A	Moderate Beneficial
Townscape & Visual	Nearby residents & visitors	Site set-up; boundary fencing & hoardings – all integrated & managed through CEMP	CEMP	Negligible
Air Quality - fugitive dust	Human receptor locations	Specific measures to control dust	CEMP	Negligible
Air Quality – traffic emissions	Existing residential	Sustainable construction travel plan to reduce HGV movements	CEMP	Minor Adverse Not Significant
Climate Change GHG	Global climate	CEMP & travel plan	CEMP	Negligible
Noise	Workers, existing residents	Hoardings & management of noisy activities	CEMP	Negligible
Wind	Workers, residents	None required	N/A	Negligible
Transport – delay, amenity, fear & intimidation, severance, safety	Drivers, pedestrians, cyclists, public transport users	Framework Travel Plan (FTP)	FTP	Permanent, long-term Neutral – Minor Adverse effects. Not Significant

Table 16.12 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (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)
Operational Phase				
Employment & Economy	Local workers & economy	None required	N/A	Minor Beneficial Not Significant
Housing	Local neighbourhoods	None required	N/A	Moderate Beneficial
Healthcare Provision	Residents	None required	N/A	Minor Adverse
Crime	Residents & visitors	None required	N/A	Negligible
Open Space & recreation facilities				
Air Quality – road traffic emissions	Human receptor locations	Offsetting measures in the form of sustainable transport principles – 10% EVC charging & cycle parking	Operational Mitigation Strategy	Negligible
Noise	Residents & visitors	None required	N/A	Negligible
Climate Change – embodied C	Global climate – human health	Consideration will be given to further reducing carbon during detailed design		Negligible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Climate Change – Transport GHG	Global climate - human health	Implementation of Travel Plan & increased encouragement of sustainable transport		Moderate-Minor Adverse
Townscape & Visual	Residents & visitors	None required	N/A	Overall Beneficial
Daylight, sunlight & overshadowing	Surrounding residential	None required	N/A	Negligible to Moderate Adverse – Not Significant
Wind	Residential – safety, comfort	None required	N/A	Primarily Negligible
Wind	Residential – safety, comfort	Location of seating areas on terrace for small number of locations		Negligible - Not Significant
Transport – delay, amenity, fear & intimidation, severance, safety	Drivers, pedestrians, cyclists, public transport users	Framework Travel Plan (FTP)	FTP	Permanent, long-term Neutral – Minor Adverse effects. Not Significant

Solar Glare

Table 16.13 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Solar Glare)

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 to Moderate adverse and significant effects on Solar Glare	Road users at nearby road junctions	None	N/A	Negligible to Minor adverse and significant effects on Solar Glare

Table 16.14 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Solar Glare)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	Embedded in the design, no further mitigation needed.	N/A	Minor adverse and not significant effects on Solar Glare
Moderate adverse and significant effects on Solar Glare	Road users at MS1 and MW1 road junctions	Para 11.85: Proposed Glazing Specifications should be low reflectance to elevations specified, the VLR thresholds are 16% for the Plot E2 podium glazing and 14% for the Plot D eastern elevation residential glazing.	Planning Condition	Minor adverse and not significant effects on Solar Glare

Townscape and Visual Impact

- 16.1. The visual impact assessment has been carried out based on the assumption that all the necessary mitigation measures have been accounted for in the design process. The images for selected viewpoints illustrated in **Appendix 12.2** of the ES represent the accurate definition of the location and mass of the component parts of the Proposed EIA Development. The predicted significance of effect values are therefore the same for each representative viewpoint and Townscape Character Area as the residual effect values and are illustrated in **Table 16.15**.

Table 16.15 Summary of Receptors, Likely Significant Effects and Cumulative Effects during the operational phase (Townscape)

Location	Development Only (Residual Impact)	EIA significance	Relevant Cumulative Scheme	Cumulative Effect
1 Home Square				
Sensitivity (VR)	Low			
Sensitivity (T)	Low		Plot F	
Magnitude (VR)	Neg Beneficial		Gt Jackson St	
Magnitude (T)	Neg Beneficial		Plot G	
Significance of effect	Neg Beneficial	Not significant		Neg Beneficial
2 Whitworth Street West				
Sensitivity (VR)				
Sensitivity (T)	Medium		Plot F	
Magnitude (VR)	Low		Gt Jackson St	
Magnitude (T)	Neg Beneficial		Plot G	
Significance of effect	Neg Beneficial	Not significant		Neg Beneficial
3 Princess Street				
Sensitivity (VR)	Low		Plot F	
Sensitivity (T)	Low		Gt Jackson St	
Magnitude (VR)	Min Beneficial		Plot G	
Magnitude (T)	Min Beneficial			
Significance of effect	Neg Beneficial	Not significant		Neg Beneficial
4 St Peter's Square				
Sensitivity (VR)	Medium		Plot F	
Sensitivity (T)	High		Gt Jackson St	
Magnitude (VR)	Neg Beneficial		Plot G	
Magnitude (T)	Neg Beneficial		Whitworth St	
Significance of effect (T)	Min Beneficial			
Significance of effect (VR)	Neg Beneficial	Not significant		Neg Beneficial
5 Lower Moseley Street				
Sensitivity (VR)			Plot F	
Sensitivity (T)	Medium		Gt Jackson St	
Magnitude (VR)	Medium		Plot G	
Magnitude (T)	Neg Beneficial		Whitworth St	
Significance of effect	Neg Beneficial	Not significant		Neg Beneficial
6 Albert Square				
			Gt Jackson St	

Sensitivity (VR)	High		Plot G	
Sensitivity (T)	High		Whitworth St	
Magnitude (VR)	Neg Beneficial			
Magnitude (T)	Neg Beneficial			
Significance of effect	Min Beneficial	Not significant		Neg Beneficial
7 Deansgate				
Sensitivity (VR)	Medium		Plot F	
Sensitivity (T)	Medium/High		Gt Jackson St	
Magnitude (VR)	Min Beneficial		Plot G	
Magnitude (T)	Min Beneficial		325,327 Deansgate.	
Significance of effect	Min Beneficial	Not significant		Neg Beneficial
8 Mamucium				
Sensitivity (VR)	High		Gt Jackson St	
Sensitivity (T)	Medium/High		Plot G	
Magnitude (VR)	Mod Beneficial		Deansgate south	
Magnitude (T)	Mod Beneficial			
Significance of effect	Mod Beneficial	Significant		Mod beneficial
9 Deansgate				
			325,327 Deansgate.	
Sensitivity (VR)	Medium			
Sensitivity (T)	Medium		Deansgate south	
Magnitude (VR)	Min Beneficial			
Magnitude (T)	Min Beneficial			
Significance of effect	Min Beneficial	Not significant		Neg Beneficial
10 Deansgate				
Sensitivity (VR)	Low		Deansgate south	
Sensitivity (T)	Medium		Plot F	
Magnitude (VR)	Min Beneficial			
Magnitude (T)	Min Beneficial			
Significance of effect	Min Beneficial	Not significant		Min beneficial
11 Deansgate Tram Station				
Sensitivity (VR)	Low			
Sensitivity (T)	Medium		Deansgate south	
Magnitude (VR)	Min Beneficial		Plot F	
Magnitude (T)	Min Beneficial			
Significance of effect (T)	Min Beneficial			
Significance of effect (VR)	Neg Beneficial	Not significant		Neg Beneficial
12 Castlefield Basin				
Sensitivity (VR)	Medium		Deansgate south	
Sensitivity (T)	Medium		Plot F	
Magnitude (VR)	Mod Beneficial		Great Jackson St Plot G	

Magnitude (T)	Mod Beneficial	Significant	Mod beneficial
Significance of effect	Mod Beneficial		
13 A56 Interchange			
Sensitivity (VR)	Low		
Sensitivity (T)	Low		
Magnitude (VR)	Min Beneficial		
Magnitude (T)	Min Beneficial		
Significance of effect	Neg Beneficial	Not Significant	None
14 Regent Road			
Sensitivity (VR)	Low	Plot F	
Sensitivity (T)	Low	Great Jackson St Plot G	
Magnitude (VR)	Min Beneficial	Arundel St	
Magnitude (T)	Min Beneficial		
Significance of effect	Min Beneficial	Not significant	Min beneficial
15 Trinity Way			
Sensitivity (VR)	Med	Plot F	
Sensitivity (T)	Low	Great Jackson St Plot G	
Magnitude (VR)	Min Beneficial	Deansgate south	
Magnitude (T)	Min Beneficial	Arundel St	
Significance of effect (T)	Neg Beneficial	Trinity Islands	
Significance of effect (VR)	Min Beneficial	Not significant	None
16 St George's Park			
Sensitivity (VR)	Medium	Plot F	
Sensitivity (T)	Medium	Great Jackson St Plot G	
Magnitude (VR)	Min Beneficial		
Magnitude (T)	Min Beneficial		
Significance of effect	Min Beneficial	Not significant	Neg beneficial
17 Wilfrid's Park			
Sensitivity (VR)	High	Plot F	
Sensitivity (T)	Low	Great Jackson St Plot G	
Magnitude (VR)	Min Beneficial		
Magnitude (T)	Min Beneficial		
Significance of effect (T)	Min Beneficial	Not significant	
Significance of effect (VR)	Mod beneficial	Significant	Min beneficial
18 Hulme Park			
Sensitivity (VR)	Medium		
Sensitivity (T)	Low	Plot F	
Magnitude (VR)	Mod Beneficial	Great Jackson St Plot G	
Magnitude (T)	Mod Beneficial		

Significance of effect (VR)	Mod Beneficial	Significant	
Significance of effect (T)	Min Beneficial	Not significant	Min beneficial
19 Hulme Arch Bridge			
Sensitivity (VR)	Low		Plot F
Sensitivity (T)	Low		Great Jackson St Plot G
Magnitude (VR)	Min Beneficial		
Magnitude (T)	Min Beneficial		
Significance of effect	Neg Beneficial	Not significant	Neg Beneficial
20 A56			
Sensitivity (VR)	Medium		Great Jackson St Plot G
Sensitivity (T)	Medium		Whitworth St
Magnitude (VR)	Min Beneficial		Deansgate south
Magnitude (T)	Min Beneficial		
Significance of effect	Min Beneficial	Not significant	Neg Beneficial

Traffic and Transport

Table 16.16 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the Construction Phase (Transport)

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				
Driver Delay	Drivers on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Public Transport Users	Public Transport Users	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Pedestrian Delay	Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Pedestrian Amenity	Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Fear and Intimidation	Cyclists and Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Severance	Cyclists and Pedestrians on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.
Collisions and Road Safety	Drivers, Pedestrians and Cyclists on Local Highway Network	CEMP	To be undertaken by contractor	Temporary, short-term Minor Adverse effect. Not Significant.

Table 16.17 - Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the Operational Phase (Transport)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Driver Delay	Drivers on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Public Transport Users	Public Transport Users	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Pedestrian Delay	Pedestrians on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Pedestrian Amenity	Pedestrians on Local Highway Network	FTP New Pedestrian/Cycle Crossings	Ongoing promotion of the Travel Plan process Implemented as part of the highway works/landscape design	Permanent, long-term Negligible effect. Not Significant.
Fear and Intimidation	Cyclists and Pedestrians on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.
Severance	Cyclists and Pedestrians on Local Highway Network	FTP New Pedestrian/Cycle Crossings	Ongoing promotion of the Travel Plan process Implemented as part of the highway works/landscape design	Permanent, long-term Negligible effect. Not Significant.
Collisions and Road Safety	Drivers, Pedestrians and Cyclists on Local Highway Network	FTP	Ongoing promotion of the Travel Plan process	Permanent, long-term Negligible effect. Not Significant.

Wind Microclimate

Table 16.18 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Wind)

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	-	None	-	Not Significant / Temporary

Table 16.19 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Wind)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3' and 'Phase 4' in existing surrounds, Scenario 5)				
Moderate Adverse	B	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing /	-	Not Significant / Permanent

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
		short period of sitting' during the summer months		
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3', 'Phase 4', 'Phase 5' and 'Phase 6' in existing surrounds, Scenario 7)				
Moderate Adverse	B, E, G, H	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing / short period of sitting' during the summer months	-	Not Significant / Permanent
Moderate Adverse	D	Side Screens	-	Not Significant / Permanent
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent
Operational Phase ('Phase 1', 'Phase 2', 'Phase 3', 'Phase 4', 'Phase 5' and 'Phase 6' in cumulative surrounds, Scenario 13)				
Moderate Adverse	E, G, H	Sitting areas to be located within a portion of the terrace where wind conditions are suitable for at least 'standing / short period of sitting' during the summer months	-	Not Significant / Permanent
Moderate Adverse	D	Side Screens	-	Not Significant / Permanent
Negligible	All other receptors	As described in Section 2 of the Wind Microclimate Technical Report (Appendix 14.1)	-	Not Significant / Permanent

Socio-economic

Table 16.20 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase (Socioeconomic)

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				
Uplift in local construction employment	Individuals seeking construction employment and the local economy (through GVA)	None	n/a	Temporary, Moderate Beneficial, Significant

Table 16.21 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase (Socioeconomic)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Net change in operational employment (and change in GVA)	Individuals seeking construction employment and the local economy (through GVA)	None	n/a	Permanent, Minor Beneficial
Uplift in local household spend, increasing local expenditure, including on retail, household goods, food and drink, local transport, recreation and leisure and other expenditure likely to be spent locally.	Local economy (through GVA)	None	n/a	Permanent, Minor Beneficial
Additional demand for healthcare facilities (GP services and dentists) as a result of the uplift in population.	Primary healthcare facilities	None	n/a	Permanent, Minor Adverse
Additional demand for the use of the existing leisure facilities and open/amenity space	Open space and recreational facilities and their users	None	n/a	Permanent, Minor Beneficial
A reduction in crime as a result of 'Secured by Design'	Reduction in Crime and Fear of Crime	None	n/a	Permanent, Minor Beneficial

17. Type 1 Cumulative Effects

Introduction

- 17.1. This Chapter gives consideration to ‘Type 1’ cumulative effects.
- 17.2. The assessment is informed by the results of the technical assessments as set out in Chapter 6 - 15 of the ES.
- 17.3. 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.
- 17.4. 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

- 17.5. 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’.
- 17.6. The EIA Regulations require ‘a description of the likely significant effects’, including cumulative effects.
- 17.7. 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

- 17.8. 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

- 17.9. 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.
- 17.10. 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’.
- 17.11. 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

- 17.12. 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.

- 17.13. 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.
- 17.14. The assessment has primarily focused on sensitive receptors identified within close proximity to the EIA Site (e.g. local residents and businesses located in close proximity to the EIA Site), likely cumulative effects, and their capacity to accommodate changes that will occur as a result of the combined residual environmental effects.
- 17.15. 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.
- 17.16. 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.
- 17.17. For the purposes of the assessment, receptor groups have been identified as those surrounding the EIA Site and those identified within the individual technical assessments.

Significance Criteria

- 17.18. 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.
- 17.19. 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

- 17.20. 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.
- 17.21. 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

- 17.22. Based on the methodology detailed above, **Table 17.1** 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.

Table 17.1: Type 1 Cumulative Effects – Construction Phase

Sensitive Receptor Group	Construction Phase Residual Effects	Likely Significant Cumulative Effects
Construction site workers	Negligible to minor adverse noise and vibration on construction workers during construction works	No likely significant Type 1 cumulative effects
Neighbouring residential properties	Negligible to minor adverse impacts arising from construction noise and vibration, and transport	Temporary in-combination effects of construction phase noise impact, transport and air quality. Negligible to Minor adverse, temporary
Local highway, public transport, pedestrian, and cycle networks	Negligible to Minor adverse effects on road users from Solar Glare Minor adverse on pedestrians and cyclists from increased intimidation, reduced amenity, severance and potential increased road safety risk from transport	Temporary in-combination effects of construction phase solar glare and transport. Negligible to Minor adverse, temporary
Job Creation and Economic Benefits	Minor beneficial impact on construction job creation, expenditure and Manchester GVA.	No likely significant Type 1 cumulative effects
Views, visual setting, and townscape	Minor to moderate beneficial impacts on select views.	No likely significant Type 1 cumulative effects

- 17.23. **Table 17.1** shows that there is the potential for in-combination construction phase Type 1 cumulative effects to arise in relation to the following receptor groups:
- Local highways, public transport, and cycle networks; and
 - Neighbouring residential properties.
- 17.24. Individual residual effects with the potential to give rise to a Type 1 cumulative effect are predominantly expected to relate to the interaction between temporary adverse transport impacts (due to construction), noise and vibration (nuisance), air quality and solar glare impacts.
- 17.25. The combined effects are not considered likely to pose a significant risk to health or wellbeing due to the use of best practice construction measures and the temporary nature of the works.
- 17.26. The adverse Type 1 cumulative effect arising from the interaction of transport, noise and vibration, and solar glare impacts would occur throughout the construction phase. However, as the works progress then the location and severity of the cumulative effect will be varied in magnitude and duration. The initial development phases where piling is undertaken is the most likely to have a more adverse cumulative effect, though will be limited in duration. The most sensitive receptors are considered to be the residents of nearby residential properties surrounding the EIA Site. Impact in relation to solar glare will increase as the construction phase advances to completion.
- 17.27. Although the potential for a Type 1 cumulative effect arising from dust, noise and vibration, air quality and solar glare impacts has been identified, this will be temporary and limited to certain elements of the construction phase. This is aside from Solar Glare which is also an operational phase cumulative impact.
- 17.28. The identified effect is 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 Demolition and Construction Method Plan, which is standard construction best practice, to be agreed between the applicant and MCC as a planning condition.

Operational Phase

- 17.29. Based on the methodology detailed above, **Table 17.2** 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.

Table 17.2: Type 1 Cumulative Effects – Operational Phase

Sensitive Receptor Group	Operational Phase Residual Effects	Likely Significant Cumulative Effects
Neighbouring residential properties	Negligible to Moderate Adverse impacts on daylight, sunlight and overshadowing.	No likely significant Type 1 cumulative effects
Local highway, public transport, pedestrian, and cycle networks	Minor adverse impacts on road users from Solar Glare	No likely significant Type 1 cumulative effects
Operational Carbon Emissions	Moderate to Minor adverse impact on operational transport emissions (permanent)	No likely significant Type 1 cumulative effects
Local Healthcare Facilities	Minor adverse impact from additional demand for healthcare facilities (GP services and dentists) as a result of the uplift in population.	No likely significant Type 1 cumulative effects
Open space and recreational facilities and their users	Minor beneficial impact on existing leisure facilities and open/amenity space and moderate adverse impact on daylight, sunlight and overshadowing.	Permanent in-combination effects of operational phase impact to existing leisure facilities and open/amenity space. Minor beneficial to Moderate adverse, permanent.
Crime and Fear of Crime	Minor beneficial impact in reduction in crime as a result of 'Secured by Design'	No likely significant Type 1 cumulative effects
Job Creation and Economic Benefits	Minor beneficial impact on local economy	No likely significant Type 1 cumulative effects
Views, visual setting, and townscape	Minor to moderate beneficial impacts on select views.	No likely significant Type 1 cumulative effects

- 17.30. **Table 17.2** shows that there is primarily unlikely to be in-combination operational phase Type 1 cumulative effects to arise to most receptors. This is due to the extensive technical assessments throughout the design process and the identified mitigation in-built into the design.
- 17.31. There is however the potential for in-combination operational phase Type 1 cumulative effects to arise in relation to open space and recreational facilities and their users. Individual residual effects with the potential to give rise to a Type 1 cumulative effect are predominantly expected to relate to the interaction between minor beneficial effects to moderate adverse impacts in daylight, sunlight and overshadowing and existing leisure facilities.

- 17.32. There will be overshadowing impacts to a number of amenity areas located within the vicinity of the Site and as a result of the Proposed Development. These are minor to moderate in impact but are not considered significant. For most of these amenity areas, the baseline levels to these amenity areas are low given the surrounding plots of land being underdeveloped and therefore such a reduction in sunlight is expected. It is however important to recognise that given the emerging context for the regeneration of this part of the city centre that new developments of similar scales may come forward in line with what is anticipated by the SRF and therefore deliver these reductions. The Proposed Development will however deliver a significant amount of public realm, open to the general public which will supplement the existing amenity areas in the wider area.

Mitigation Measures

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



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