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Environmental Statement: Volume 1

Plot F – Great Jackson Street

November 2021

Deloitte.



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Date: 10/11/2021





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Date: 8/11/2021

Important notice: This Environmental Statement has been prepared by Deloitte Real Estate, with technical input from Ensafe, WSP, GIA, Enfusion, Fisher Acoustics, Chris Burnett Associates, Curtins and Ekosgen "the Consultants". Chapter 1, Volume 1 of this Environmental Statement sets out the parties responsible for preparing each Chapter and associated figures and appendices.

Although we have read the Consultants' reports for consistency and provide our observations based on our knowledge and experience, we accept no liability or responsibility for the Consultant's Reports and will not be responsible for the technical content of Chapters 6-15, Volume 1, nor Volumes 2 – 3, nor the technical content of the associated separate Non-Technical Summary.

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1. Introduction

1.1. This Environmental Statement ('ES') has been prepared in support of a planning application submitted to Manchester City Council (MCC) for a residential led, mixed-use development on land at Plot F, Great Jackson Street, Manchester.

1.2. Renaker Build Ltd ('The Applicant') is seeking Full Planning Permission for two new residential tall buildings with basement car parking, public realm, servicing access and highways works (the 'Proposed Development').

1.3. The Site measures approximately 0.88 ha and is bound by Great Jackson Street to the south and west, Owen Street and Deansgate Square to the north, and Boatmans to the east ('the Site'). The Site is referred to as 'Plot F' within the Great Jackson Street masterplan and the location is identified in Figure 1.1.

1.4. The Planning Application seeks permission for the following description of development:

"Full planning permission for the demolition of existing structures and the erection of two 51-storey residential buildings (Use Class C3) across two phases, including residential amenity facilities, basement car 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 this Application.

1.6. The proposed phasing plan is included at Figure 1.2 to this ES Chapter.

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

Requirements for EIA

1.8. 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 on 28 June 2021 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 where possible. A copy of the scoping report is included in Appendix 2.1.

1.13. A formal response to the EIA Scoping Request was provided on 14 August 2021, which confirmed the proposed scope set out in Appendix 2.1 was broadly in line with the requirements of statutory consultees. Any additional requests made by Statutory Consultees through the Scoping Opinion have been factored into this ES.

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 Real Estate has significant experience and expertise in managing the EIA process and hold the IEMA EIA Quality Mark. Deloitte Real Estate has managed the EIA process and has received technical input from a range of suitably qualified and experienced technical consultees. Details of the EIA Technical Team and qualifications are set out in Table 1.1 below.

Table 1.1: EIA Technical Team

Topic	Assessment Carried Out By
Air Quality	Ensafe

Topic	Assessment Carried Out By
Climate Change	WSP
Daylight, Sunlight and Overshadowing	GIA
Solar Glare	GIA
Human Health	Enfusion
Noise and Vibration	Fisher Acoustics
Townscape and Visual Impact	Chris Burnett Associates
Traffic and Transport	Curtins
Wind Microclimate	WSP
Socio-Economics	Ekosgen

Phasing and EIA Scenarios

1.16. The Proposed Development will be phased in order to facilitate delivery process of each part of the scheme and a phasing plan is provided as Figure 1.3 to this chapter. The sequence of phased delivery is proposed as follows:

- Phase A – Tower F2, plus F2 basement car parking, landscaping and access.
- Phase B – Tower F1, plus F1 basement car parking, landscaping and access.

1.17. Given the form of application, the EIA has considered the sequence of phased delivery outlined in paragraph 1.16. These have been devised so that environmental effects arising from the phasing of the development are robustly assessed. The proposed EIA scenarios for this planning application are:

- Scenario 1: Existing baseline
- Scenario 2: Phase A;
- Scenario 3: Scenario 2 + Committed Developments;
- Scenario 4: Phases A and B; and
- Scenario 5: Scenario 4 + Committed Developments.

1.18. The EIA scenarios proposed by each consultant are summarised below:

Table 1.2: Summary of EIA scenarios

Chapter	Consultant	Scenarios Tested	Comments
Air Quality	Ensafe	Scenario 1; Scenario 4; and Scenario 5.	Please note the future year scenarios (Scenarios 4 & 5) will be considered in conjunction with the anticipated 2027 baseline opening year conditions. The future baseline represents anticipated traffic flows for 2027, including committed development flows. This scenario does not include development generated flows in order to make a judgement of potential impacts on existing conditions as a result of the Proposed Development. With regards to associated Air Quality impacts, the worst-case scenario provides an assessment of maximum anticipated development traffic generation and thus a worse-case scenario will be assessed.
Climate Change	WSP	Scenario 1; and Scenario 4.	In the future, embodied carbon of the Proposed Development will remain the same but operational emissions will be reduced significantly, so emissions will improve and therefore we can only calculate the worst-case scenario for the future baseline. The assessment will not consider any specific Committed Developments relevant to the Proposed Development because GHG are not spatially contained, the assessment will consider the cumulative effect of all GHG that cause climate change and the assessment of the GHG due to the Proposed Development contextualises GHG comparing these to the UK Carbon Budgets and RIBA 2030 Climate Change targets. For this reason the ES Chapter will not consider a standalone cumulative scenario.
Daylight, Sunlight and Overshadowing	GIA	Scenario 1; and Scenario 5.	Schemes under construction and with planning consent but not under construction have been included in the baseline scenario in line with the BRE Guide, and so no separate technical assessment of the cumulative impact is required. The scenarios represent a worst-case. This is the appropriate method to determine the daylight and sunlight impacts to surrounding receptors as the baseline scenario already considers any impact on the existing surrounding receptors resulting from consented developments. This approach is supported by the BRE. As Hulme Park is located to the south of the Proposed Development, the path of the sun will continue to cast sunlight onto the area throughout the day. As such, there is no potential for overshadowing and so it will not be assessed. A new park is proposed as part of Crown Street Phase 2 and a Daylight/Sunlight assessment has been undertaken on this receptor to appreciate the impact in APSH.

Chapter	Consultant	Scenarios Tested	Comments
Solar Glare	GIA	Scenario 4.	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. It is unlikely that solar reflections would be generated by the installed glazing/cladding of Phase A in isolation due to the proposed construction programme overlapping, whereby construction of Phase B would be advanced by the time Phase A is completed. 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 as part of the baseline within the surrounding context as their completed form due to their construction having commenced: • 2-4 Chester Road; • Deansgate Square; • Crown Street Phase 1 (Elizabeth Tower and Victoria Residence); • Crown Street Phase 2 (excluding the School); and • Viadux.
Human Health	Enfusion	Scenario 5.	Scenario 5 (Worst Case Scenario) will be tested only, as the impact from one phase of development will not outweigh the total impact from the whole development alongside cumulative developments. Therefore, no greater significant effects will arise from a single phase being delivered.
Noise and Vibration	Fisher Acoustics	Scenario 5.	Given the relatively small distances from Phase A and Phase B to the respectively closest noise sensitive receptors, and the distance between Phase A, Phase B and the Committed Developments, the noise impact and any associated mitigation measures for Scenarios 2, 3, 4, and 5 are expected to be the same. It is therefore intended that only Scenario 5 is tested.
Townscape and Visual Impact	Chris Burnett Associates	Scenario 5.	The scenario which is the focus of the TVIA is the worst-case scenario which is Scenario 5. Other scenarios have been discounted as the effects of the construction of one tower on this Site are predicted to be more or less the same as two towers, hence it is appropriate to test the worst-case scenario.
Traffic and Transport	Curtins	Scenario 5.	A committed development schedule has been prepared to inform Scenario 5 above. Only those developments that would have a material impact in the study area will be included in

Chapter	Consultant	Scenarios Tested	Comments
			the assessment. Scenario 5 provides the worst case for the purpose of the assessment.
Wind	WSP	Scenario 1; Scenario 2; Scenario 3; Scenario 4; and Scenario 5.	The methodology to be adopted for the study incorporates Computational Fluid Dynamics (CFD) modelling to predict the wind field within and in the vicinity of the Proposed Development.
Socio-Economics	EKOSGEN	Scenario 5.	Scenario 5 only, as the impact from one phase of development will not outweigh the total impact from the whole development alongside cumulative developments. Therefore, no greater significant effects will arise from a single phase being delivered.

Organisation of the Environmental Statement

1.19. 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.

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

Table 1.3: Structure of this Environmental Statement

Chapter No.	Chapter Title	Description
VOLUME 1		
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.

Chapter No.	Chapter Title	Description
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.
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

1.21. Together with this ES, the following documents will be submitted to Manchester City Council in support of the planning application. These non-ES documents include:

Table 1.4: Planning Application Supporting Documents

Document	Prepared By
Existing Site Plan	SimpsonHaugh and Partners (SHP)
Proposed plans, sections and elevations	SHP
Application Form	Deloitte Real Estate
Verified Views (located principally within the Heritage and TVIA deliverables)	Ambiente
Statement of Consultation	Deloitte Real Estate
Planning and Tall Building Statement	Deloitte Real Estate
Green and Blue Infrastructure Statement (appended to Planning and Tall Building Statement)	Deloitte Real Estate
Design and Access Statement	SHP
Archaeological Desk Based Report	Salford Archaeology
Environmental Standards Statement including an Energy Statement	Element Sustainability
Ventilation Strategy	MEP Design
Ecology Report	ERAP
Crime Impact Statement	Greater Manchester Police (GMP) Design for Security
Framework Travel Plan	Curtins
Site Waste Management Strategy	Renaker / SHP
TV Reception Survey	Pager Power
Broadband Connectivity Report	Pager Power
Viability Assessment	Renaker
Residential Management Strategy	Zenith
Safety Assessment (Manchester Airport)	Pager Power

Document	Prepared By
Ground Conditions Phase 1 Report and Phase 2 Report	WSP
Flood Risk and Drainage Strategy	Curtins
Landscape Design Statement	TPM
Landscape Management Report	TPM
Heritage Statement	Stephen Levrant Heritage Architecture
Local Labour Agreement – Statement of Intent	Renaker

Environmental Statement Availability

1.22. 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.

1.23. 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.

1.24. For copies of any of the above, please contact the Manchester Planning Team at Deloitte Real Estate.

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Figure 1.1 – Red Line Site Plan (Application Boundary)

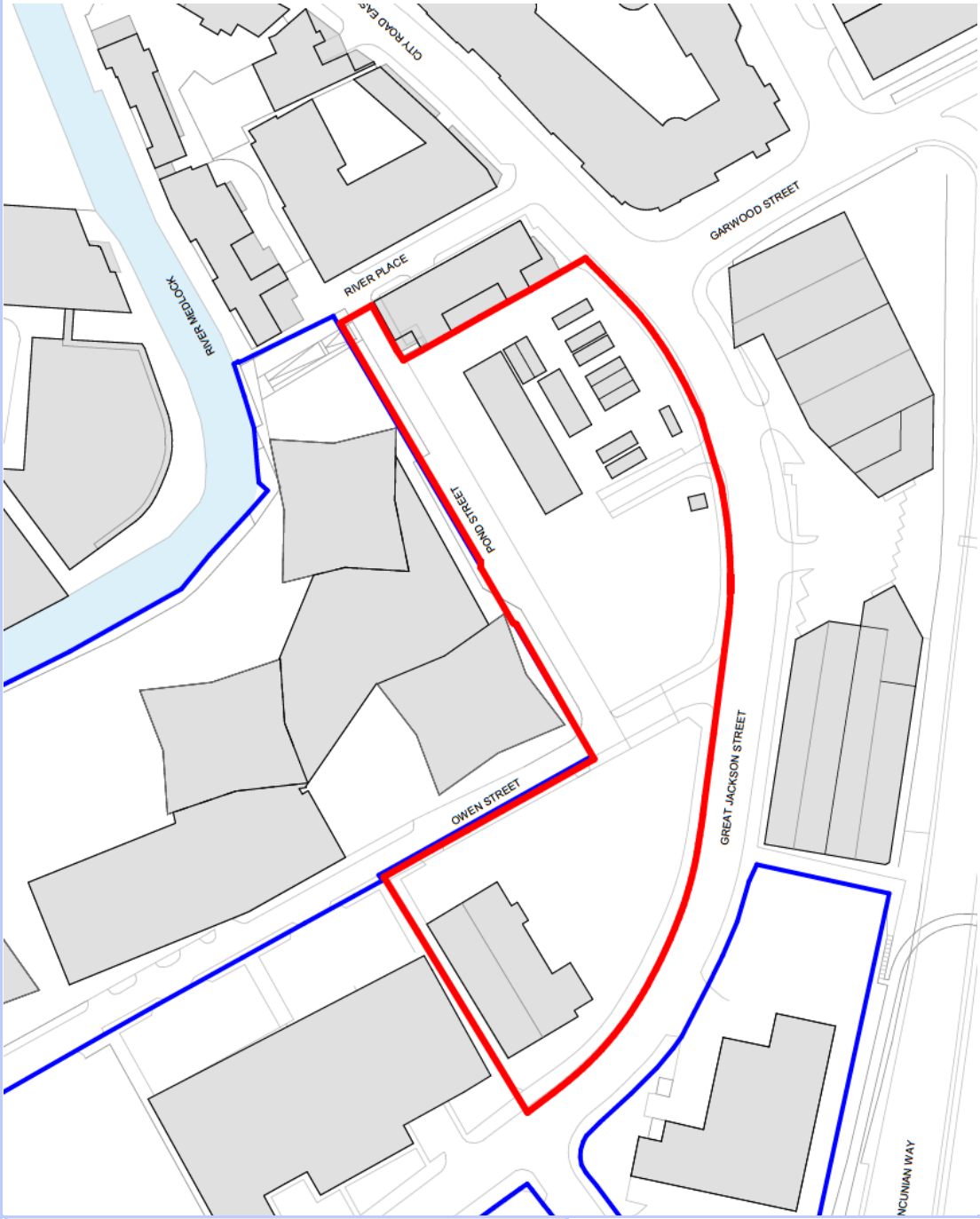


Figure:	1.1		
Title:	Red Line Site Plan		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A

Figure 1.2 – Phasing Plans (Ground and Basement)

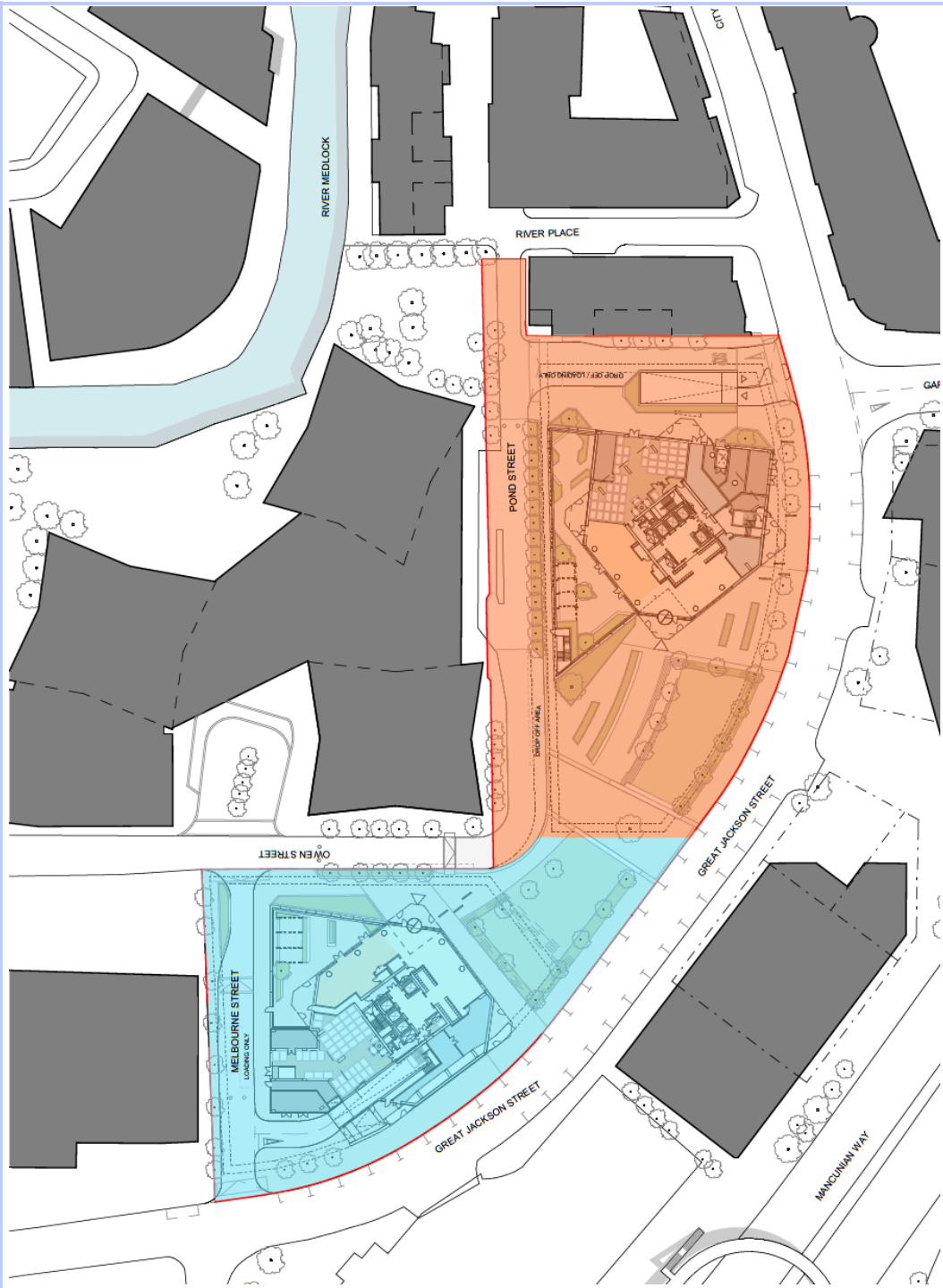


Figure:	1.2		
Title:	Phasing Plan		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A

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.

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.
- Impact Assessment Guidelines and ES Review Criteria, Institute of Environmental Management and Assessment (IEMA), 2004.
- Tower Hamlets Council EIA Scoping Guidance, January 2012.
- 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.

Screening and Scoping and Consultation

Scoping

2.4. A formal EIA scoping request was submitted to Manchester City Council on 28 June 2021 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.

2.5. A formal response to the EIA Scoping Request was provided on 14 August 2021, which confirmed the proposed scope set out in Appendix 2.1 was broadly in line with the requirements of statutory consultees. Any additional requests made by Statutory Consultees through the Scoping Opinion have been factored into this ES.

2.6. Where possible, 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.

2.7. The agreed scope is detailed with the 'Assessment Methodology and Significance Criteria' section of each Technical Chapter.

2.8. 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

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

Table 2.1: Scope of 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

2.10. 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 June and July 2021.

2.11. 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.

2.12. Prior to the online exhibition, leaflets were delivered to a consultation zone, which included 2,133 properties in the vicinity of the Site and building managers were also send the leaflet by email to maximise reach. This was confirmed as acceptable as a consultation zone with Manchester City Council Planning Officers.

2.13. A separate briefing pack was sent to Elected Ward Members inviting them to a separate briefing session ahead of the Public Exhibition. A discussion was held with the Ward Councillors from the Deansgate and Hulme Wards on 10 June 2021.

2.14. 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

2.15. 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

2.16. 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

2.17. 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.

2.18. 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.

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

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

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

Structure of Technical Chapters

2.22. 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.

Technical Chapter Structure	
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.

2.23. 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

2.24. 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

2.25. 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.

Sensitivity	Examples of Receptor
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

2.26. 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

2.27. 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'.

2.28. 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

2.29. 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.

2.30. Given the complex nature of the 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.

2.31. 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

2.32. 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.

2.33. 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.

2.34. 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.

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

Cumulative Effects

2.36. 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').

2.37. A search of Manchester City Council'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, for which agreement was provided by the Local Planning Authority as part of the Scoping Opinion process.

2.38. 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.

2.39. 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.

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

Residual Effects

2.41. 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

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

- All of the principal land uses adjoining the Site remain. Where redevelopment proposals have been granted Planning Permission, the effect of those proposals are considered as part of the Cumulative Impacts;
- Baseline conditions have been established in 2021 from a variety of sources 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, 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

2.43. 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.

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

3. Alternatives and Design Evolution

Introduction

3.1. Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations requires the Applicant to provide an outline of the main alternatives studied and an indication of the main reasons for the choice made, 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 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 Site in its current state. The Site is currently used as a site compound for construction works on an adjacent development. However, prior to this its permanent use was as a surface level car park.

3.6. The principle of the 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 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 Site is considered suitable for residential use in terms of its urban location, close proximity to established neighbourhoods, transport links and connections with Manchester City Centre.

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 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.

Consideration of Alternative Locations

3.10. The 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 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 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 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 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 Frame work 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 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 Site's proposed use is for residential development. Other reasonable alternative uses, considering its City Centre location, have been discussed below:

- Retail - The Site falls outside Manchester City Centre's Primary Shopping Area and a large-scale standalone retail development on this 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 Site, namely Regent's Road Retail Park in Salford. Delivering a retail development on the Site has therefore been discounted.
- Hotel – The size of the Site and required quantum of development would present challenges for hotel use, as the demand for hotels in this part of the city centre would not be viable at

this scale. In addition, the 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 Site's context and location, a hotel development on the Site has been discounted.

- Office - The Site does not form part of an existing commercial cluster, such as the emerging 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. Furthermore, it is located within a part of the City Centre that is establishing a residential character and the introduction of a large commercial building would not support the vision set out within the Great Jackson Street Development Framework. Whilst there is a need for more commercial development to be brought forward within the City Centre, it is considered that there are better and strategically supported opportunities for such development to be better located closer to the City core alongside other mixed commercial uses.

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 Site's surrounding regeneration and has provided an important guide, which has underpinned both the guidance set out in the Great Jackson Street Framework and the final design of the scheme being applied for.

3.19. The Site's location within the Great Jackson Street Development Framework, and its position adjacent to the to the south of Deansgate Square development and north of Plot G, have also informed the Proposed Development in terms of scale, density, quality and materiality.

3.20. The design concept seeks to respond to the opportunities and constraints established in the Site's context analysis so as to contribute to the ongoing development and enhancement of the surrounding area.

3.21. 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.

3.22. 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

3.23. The design evolution of the Proposed Development has developed by responding to the Site's setting adjacent to the Deansgate Square cluster and its location within the Great Jackson Street Development Framework.

3.24. The Great Jackson Street Development Framework (2018) provides a guide for the Site to deliver three tall buildings (Building F1, F2 and F3 in the Framework) at 33, 35, and 44 storeys.

3.25. Lower density development was not considered suitable for the currently underutilised Site, as it would not maximise the regenerative benefits of a highly accessible, City Centre location. In line with MCC policy, City Centre development will generally be high density and it is considered to be a location where land should be used to maximise its efficiency and reuse of brownfield sites.

3.26. The Proposed Development has carefully considered the principles contained within the Development Framework and the outcome of the design development process it is to deliver two taller towers (Building F1 and F2), now proposed to both be 51 storeys in height. The revised approach of delivering two towers, as opposed to three, is considered to be the most suitable design solution for the following reasons:

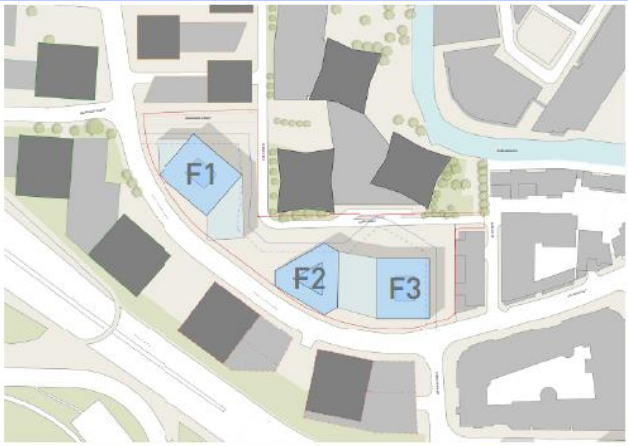
- There are efficiencies of delivering at this scale, with a significant reduction in the complexity of the construction with associated cost saving. The quality of the development can therefore be maximised by reducing the scheme from three towers of varied height to two buildings at 51 storeys.
- Creating two elegant and slender towers allows more light to penetrate into the Framework area, including the public realm and to nearby buildings, due to the wider spacing between the towers. As a result of the greater separation distance between the two towers, meaningful and high-quality public space can be provided to also support key linkages between the City Centre and Hulme; and
- The two 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.
- Building heights will relate better to the taller tower being delivered as part of the Crown Street Phase 1 and 2 development (also 51 storeys in height), Plot G and Deansgate Square. This prominent clustering signalises southern gateway to the City Centre and thus it demands high quality buildings of scale to reflect this.

3.27. The two-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.

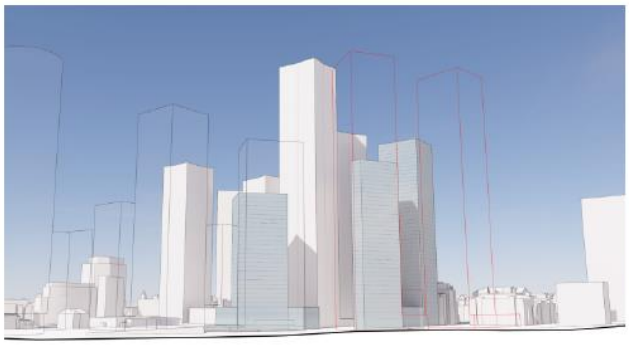
3.28. Notwithstanding the difference in form and scale, the proposals have been developed to directly respond to and align with the key components of the Framework and will make a positive contribution to the delivery of the Framework vision.

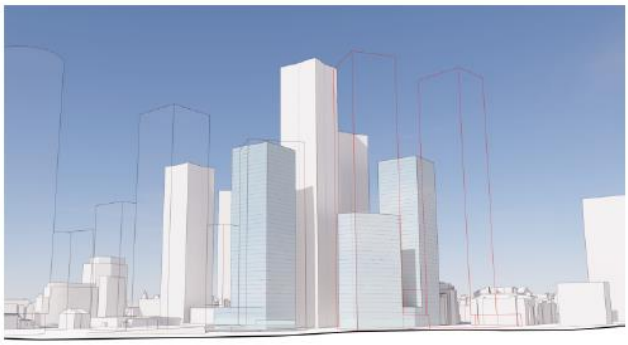
3.29. The Design and Access Statement submitted with the application sets out the options appraisal for the development which details how design of the Proposed Development has been formulated. The options considered for the development were considered within the context of the Site and the final design is considered to respond most appropriately to the context.

3.30. On this basis, it is considered that alternative scale and massing has been considered and reasonably discounted.









2018 FRAMEWORK ARRANGEMENT

- 3 tower volumes; F1, F2 & F3
- Massing steps up in height from plot F1 to F3
- High density between F2 & F3
- F2 encroaches into Deansgate Square 20m proximity constraint
- F3 encroaches into Boatmans 20m proximity constraint

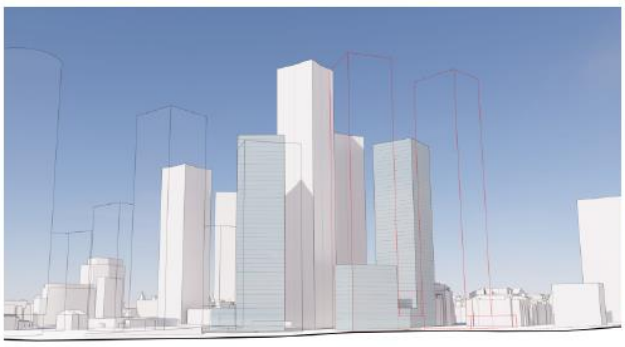
DESIGN DEVELOPMENT ITERATION 01

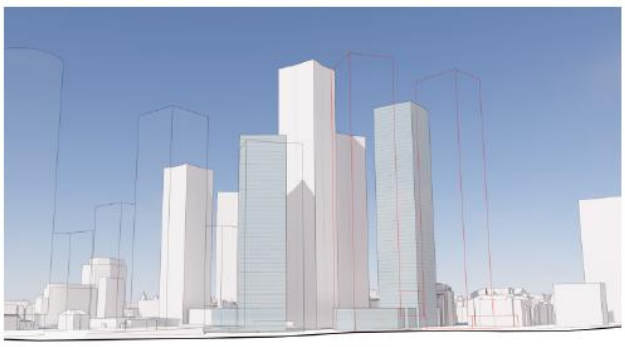
- 3 tower volumes; F1, F2 & F3
- Lowering of F2 improves separation between F1 & F3 towers and also relationship with South tower of Deansgate Square
- F1 & F3 heights are balanced
- High density between F2 & F3 with direct facing elevations
- F3 moved away from Boatmans to maintain 20m proximity, but has a direct facing aspect

Figure:	3.1		
Title:	Consideration of Alternatives		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A









DESIGN DEVELOPMENT ITERATION 02

- 2 tower volumes & 1 lower volume
- Further lowering of F2 improves relationship with Deansgate Square
- Additional increase in height for F1 & F3 provides distinct separation between taller & lower volumes
- Rotation of F1 form also improves separation distances and reduces direct facing elevations

DESIGN DEVELOPMENT ITERATION 03

- 2 tower volumes & podium
- Further lowering of middle volume omits central building and creates 2 separate towers; F1 & F2
- Further improvement to relationship with Deansgate Square
- Increased daylight penetration into Pond St
- Tower cluster composition is less dense

Figure:	3.2		
Title:	Consideration of Alternatives		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A



Figure:	3.3		
Title:	Consideration of Alternatives		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A

4. Site, Surroundings and Description of Proposals

Introduction

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

Site Description

4.2. The Site comprises Plot F of the Great Jackson Street (GJS) Framework area and measures approximately 0.88 ha. The Site is bounded by Great Jackson Street to the south, Deansgate Square to the north, the Boatmans apartments to the east, and industrial units to the west. The Site Location Plan is shown in Figure 1.1.

4.3. The Site is currently accessed from both Great Jackson Street to the south of the Site and Owen Street to the north. The Site is currently occupied by a low-rise industrial unit and construction compound, with associated car parking, supporting the construction of other developments in the Great Jackson Street Framework. There is no recent planning history of relevance to the Site.

4.4. The Site is itself located within Manchester City Centre and the Regional Centre as defined in MCC's adopted Core Strategy (2012) and is located in a key strategic location in the southern part of the city centre. It is a short walk from the transport hub comprising Deansgate train station and Deansgate-Castlefield Metrolink station.

4.5. 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. These two stations are also directly connected to Deansgate by the rail or Metrolink Network. Both Oxford Road and Manchester Piccadilly stations also provide direct access to Manchester Airport.

4.6. 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 (A57(M)) to the south. 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.

Site Specific Environmental Designations

Ecology

4.7. The Site is not within, nor does it contain, any ecological designations including sites of specific scientific interest (SSSI), sites of biological importance (SBI) or special protection areas (SPA). The Site lies within a Site of Special Scientific Interest (SSSI) Impact Risk Zone for the Rochdale Canal

SSSI and Special Area of Conservation (SAC) and Hollinwood Branch Canal SSSI. The River Irwell Site of Biological Importance (SBI) lies 1.5 kilometres north-west of the Site.

4.8. The Site is secured by metal fencing and has some shrub vegetation and trees present along the Site boundaries. None of these trees are subject to a Tree Preservation Order (TPO).

Heritage

4.9. The Site is not located within a Conservation Area, nor are there Listed Buildings within the red line boundary or immediately adjacent to the Site. Within a 500m radius there are 21 listed buildings, one Scheduled Ancient Monument and one conservation area, which are listed below:

1. Eastern wall fragment of Roman fort, Scheduled Ancient Monument
2. Church of St George, Grade II*
3. Churchyard Walls, Gate Piers and Gates of St. George's Church, Grade II
4. Former Bridgewater Canal Offices, Grade II
5. Former Congregational Chapel, Grade II
6. Merchant's Warehouse, Grade II
7. Middle Warehouse at Former Castlefield Goods Yard, Grade II
8. 29-41 Liverpool Road, Grade II
9. Lock-Keeper's Cottage at Lock No 91 Next to Gaythorn Tunnel, Grade II
10. Lock No. 91, at east end of Gaythorn Tunnel, Grade II
11. Rochdale Canal Lock No 92 (Dukes Lock) and Castle Street Bridge, Grade II
12. Manchester South Junction and Altrincham Railway Viaduct, Grade II
13. Deansgate Station, Grade II
14. Floodgate on east side of Knott Mill Bridge, Grade II
15. Boundary Stone on Knott Mill Bridge, Grade II
16. Roman Catholic Church of St. Wilfrid, Grade II
17. School House, Grade II
18. G MEX (Manchester Central), Grade II*
19. The Britons Protection Public House, Grade II
20. Nos. 13-17 Albion Street, Grade II
21. Former Cotton Mill on West side of junction with Cambridge Street, Grade II
22. Mill Chimney Stack on West side of junction with Cambridge Street, Grade II
23. Castlefield Conservation Area, located approximately 250m from the Site.

Environmental Conditions

4.10. As with the majority of Manchester City Centre, the Site is located within the Greater Manchester Air Quality Management Area (AQMA).

4.11. It is entirely located within Flood Zone 1 and is therefore at a low probability of flooding. As with the majority of Manchester City Centre, the Site is located within the Conurbation Core Critical Drainage Area as identified from the Manchester, Salford and Trafford Strategic Flood Risk Assessment (2011).

Site Development Context

4.12. The Site forms Plot F of the GJS 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.

4.13. Most recently, the Framework was updated to reflect the potential for further growth in this part of Manchester City Centre. Following public consultation organised by MCC, the 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.

4.14. The vision for the Framework area has remained consistent; 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.

4.15. Existing uses within the Framework area include light industrial units, office use, as well as residential and retail uses in recently completed developments. A number of the key Framework plots have either been completed or are under construction to deliver new residential-led schemes, which is set out in the list of cumulative developments (Appendix 2.1 – Scoping Report).

4.16. Of particular note, Deansgate Square, to the north of the Site, beyond Pond Street, comprises four towers that have recently been completed (Planning Ref: 111719/FO/2016/C1). Deansgate Square comprises 1,508 apartments with a mix of 1, 2 and 3 bedroom apartments across four towers of 62, 50, 44 and 37 storeys (plus a four storey amenity building), with a range of retail units at ground floor.

4.17. Crown Street Phase 1 is also currently under construction and will deliver 664 units with a mix of 1, 2- and 3-bedroom apartments, as well as townhouses and duplex apartments (Planning Permission Ref: 119806/FO/2018). Residential amenity space is provided in each building, as well as a communal terrace and ground floor commercial units including a GP surgery.

4.18. Crown Street Phase 2 is currently under construction for two new 51 storey residential towers delivering 855 units under planning permission Ref: 126668/FO/2020. It includes a public underground car park, primary school, and a 0.5ha public park and the first phase is proposed for completion in 2024. The first tower of Crown Street Phase 2, known as the Blade, will provide 414 residential apartments. The second tower is scheduled to commence construction in 2024.

4.19. Planning Permission was also approved in February 2018 on land bounded by Great Jackson Street and to the north west of the Site at Plot E of the GJS Framework area (Planning Ref: 116850/FO/2017). This approved the demolition of existing buildings and the construction of three residential buildings, which range in height of 32, 26 and 18 storeys to deliver 399 residential units, 50 retirement units and offers 675 sq. m of commercial floorspace. At present, the planning permission remains extant, but construction has not commenced.

4.20. South of Great Jackson Street lies Plot G of the Framework. A Planning Application for the development of Plot G was approved by MCC's Planning Committee in August 2021 for the development of two 56 storey tall residential buildings comprising 1,037 units and a ground floor commercial unit (Planning Ref: 129273/FO/2021).

4.21. An application was also approved in February for One City Road to the east of the Site and the City South apartments (Ref: 128002/FO/2020), which comprises the demolition of the existing offices and the construction of two new office blocks of 11 and 14 storeys, totalling circa 370,000 sq. ft.

4.22. Full details of all cumulative developments are provided in Appendix 2.1 (Volume 2) of this Environmental Statement.

Proposed Development

4.23. The Proposed Development is for the demolition of an existing industrial building on the Site and the redevelopment of the Site to provide a high quality residential scheme across two 51 storey towers alongside both publicly accessible and private public realm, internal residential amenity uses including a gym, private car parking within two and three tiered multi-storey basements and extensive cycle parking facilities.

4.24. Table 4.1 illustrates the parameters for development. It should be noted that the proposed figures are not fixed and are part of an evolving design. Maximum parameters have been assumed for the purposes of this scoping report as set out below.

Table 4.1: Proposed Uses, Floorspaces and Heights

Use	Parameters for Development
Site Area	0.88 (hectare)
Residential **(Use Class C3)**	Total Apartments: 988 Tower F2 – 494 Tower F1 – 494
Height (AOD)	Two Towers of 51 storeys each (including ground and roof)
Cycle Parking	1 space per residential unit. 100% ratio. 988 cycle parking spaces.
Resident Car Parking	296 spaces in total in two separate basement car parks – 30% provision.

Layout and Form

4.25. The layout of the development will provide two 51 storey residential towers, each with a podium containing a ground floor concierge and residential amenity spaces. Entrances to both towers face one another and into a central piece of public realm, which provides a valuable connection between Deansgate Square, Plot G and Hulme.

4.26. Below ground level, a part two-, part three-storey basement is proposed to provide car parking spaces. There is space on the ground floor and first floor which will be used for a variety of uses, such as commercial and other residential facilities, including a gym and sauna. The 24-hour concierge for both buildings are at ground level.

4.27. The buildings are slender and are over 50m apart from one another and are over 20m from Deansgate Square located adjacent to Plot F1 and F2. The orientation and shape of the towers ensures that there are no solely north-facing apartments. The corners of the building are angled and chamfered to create a varied and modern townscape in this part of the city centre to form a complementary backdrop with the other building plots both delivered and consented in the Great Jackson Street Framework area.

4.28. The dimension of the plan form allows for an efficient floorplate to be created, which provides the opportunity for a slender massing proposition that can be refined to create a unique approach using chamfered corners to each tower. Apartments are arranged around a central linear core. The linear arrangement allows for a generous landing within the lift lobby and inviting arrival experience at ground floor level.

Scale and Massing

4.29. The Proposed Development has carefully considered the principles contained within the GJS Framework and the outcome of the design development process it is to deliver two taller towers (Building F1 and F2), both 51 storeys in height.

4.30. The scale and form of the building responds to the surrounding areas both with regard to height and massing. Site specific considerations have informed the design, and these have included surrounding developments the location and accessibility of the Site, the proposed public realm, the sensitive receptors (residential apartments) and the relationship with existing and future built context.

4.31. Through design development, the layout, massing, Site position and facade have been tested and refined so that the building reaches its potential and provides a high-quality addition to Manchester's built environment. The strength of the plan form, in providing a distinctive massing arrangement, provides variety to the composition of the Great Jackson Street Framework with the constant height datum used to unify the cluster.

4.32. The resultant form creates an undulating ribbon at each corner, which are fully glazed, providing a contrast to the main elevations. Consideration has also been given to the composition and colour of the towers with the intention to create an identity for this development, which complements and contrasts with the convex facades of Deansgate Square and other tall buildings in the area.

4.33. The development of the scheme aligns with the principles of the Great Jackson Street Development Framework (2018), in that it increases the separation between the buildings, provides larger apartments albeit in a taller more elegant form.

Landscaping

4.34. The Proposed Development contains significant new elements of landscaped space and public realm which will support delivery of the wider Framework vision. A Public Realm Strategy has a been submitted in support of this application, prepared by TPM Landscape Architects.

4.35. The landscape proposals for Plot F provides extensive new public realm to generously separate the build form and provide important and well-proportioned pedestrian connectivity within the Framework Area and to adjacent areas such as Hulme, Castlefield and the City Centre.

4.36. The Public Realm Strategy has been prepared in accordance with the Public Realm Guidance Document prepared by TPM Landscaping for information purposes as part of the Crown Street Phase 1 development. The Guidance Document informs the comprehensive approach to landscaping across the Great Jackson Street Development Framework (2018) area.

4.37. Further detail is provided in the Design and Access Statement from SimpsonHaugh, with the section on landscaping prepared by TPM.

4.38. Replacement tree planting is proposed on a 10:1 basis to ensure that there is a net increase in tree cover post-development. In total, 6 trees will be removed to facilitate the Proposed Development. Of the 63 trees proposed in the public realm, 35 are set in the ground and 28 are located in raised ground. Tree planting is also provided within the central landscaped area, adjacent to the car park entrance to Building F2, and adjacent to and within the private gardens. Overall, the level of tree planting with provide a very green environment within Manchester City Centre.

Highway Re-Alignment and Access

4.39. Improvements are proposed to the highways in order to create a clear circulation hierarchy with pedestrian priority where possible. Any highways work on the public highway will be subject to appropriate sign-offs from the Highways Authority, most likely via a S278 Agreement. In summary, two vehicular access points will be created to access the Site, with both accesses located off Great Jackson Street. A diagram is provided in Figure 4.3 to this chapter.

4.40. The eastern access will be located in the vicinity of Garwood Street and will provide access to Phase A (Building F2). This access point will be two way, with the ingress movement limited to access to the basement car park. The egress movement will encompass cars exiting the Building F2 car park, and service vehicles leaving the Site from Building F2 loading and drop-off areas and Deansgate Square loading area. Cars egressing the car park will have priority over incoming vehicles along the service road, managed by a stop line.

4.41. Small service vehicles, taxis and private vehicles dropping off residents of the development will access the Building F2 loading and drop-off area via River Place, turning left at the end to Pond Street and left again onto the loading / drop-off area. This short section of Pond Street will have its direction of travel reversed, so vehicles will only be allowed to travel westbound, from River Place to Pond Street. The remainder of Pond Street will remain one-way eastbound as per the current arrangement.

4.42. The western access will be located in the vicinity of Melbourne Street and will provide access to Phase B (Building F1) car park and loading and drop-off areas. This access will be ingress only. Vehicles leaving Building F1 would turn left at the junction with Owen Street, returning to A56 Chester Road via Deansgate. To facilitate access for servicing vehicles, it is proposed that one P&D parking space will be relocated to the north of the access along Great Jackson Street.

4.43. Owen Street will be reconfigured as part of the development proposals and will no longer end at a priority junction with Great Jackson Street. This junction will be replaced with landscaping and a pedestrianised area. Following completion of the development, Owen Street will end to the south at the bend providing access to Pond Street. Owen Street will become one-way southbound only, past the proposed junction with the new road to access Building F1. This arrangement matches the SRF proposals and aspirations for this area.

4.44. Owen Street, Pond Street and the proposed access roads as part of the Proposed Development will not be offered for adoption and will remain private. Barriers will control access to the area and also to the different plots. These will also act as traffic calming measures, reducing vehicular speeds along the Site.

Construction Programme

4.45. The Applicant has provided the following indicative construction programme for delivering the proposals. This assumes the Applicant obtains planning permission during Q1 2022.

- April 2022 – F2 Anticipated Start on Site
- Dec 2023 – Anticipated Start on Site for the demolition of existing industrial building and construction of F1
- April 2026 – F2 estimated completion
- Dec 2027 – F1 estimated completion / project completion

4.46. 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 Methodology and Programme

Introduction

5.1. This Chapter of the ES has been prepared by Renaker Build Ltd and 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 following figure is included with this Chapter:

- Figure 5.1 – Logistics plan

5.3. The main aim throughout the construction period is to minimise the impact on the surrounding properties and roadways for the duration of the work. Close collaboration with all project teams of all construction projects will be maintained at all times to achieve this aim.

5.4. The following narrative explains this methodology and timescales envisaged at the time of the planning application. More detailed proposals will be submitted for approval by the LPA, 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

5.5. The total construction programme will span a period of approximately eight years within which there will be elements of ground works, foundations, frame construction, façade cladding and internal fit out. Whilst there are several issues that will determine the final programming and sequencing at the Proposed Development the target plan is to split the development into phases subject to Planning Permission being granted. The proposed key dates and durations are shown below.

- Phase 1 – Tower F2 and residents car park and part public realm– construction estimated to take four years; commencing in April 2022 and completing in April 2026
- Phase 2 – Tower F1 and Residents car park, completion of Public Realm and creation of Melbourne Street construction estimated to take four years; commencing in December 2023 and completing in December 2027
- Final public realm (for example, reinstating highway post construction and landscaping around the perimeter of the Site) and Section 278 Highways works – completion targeted for December 2027

5.6. This is an indicative construction programme and the Applicant highlights that there are multiple risks involved in the development process. The Applicant 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.

5.7. The programme is based upon normal working hours in line with Manchester City Council Guidance of 7.30hrs to 1800hrs Monday to Friday and 0800hrs to 1400hrs on Saturdays.

5.8. 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 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.

5.9. We acknowledge the close proximity of the neighbouring residents and as such will endeavour at all times to ensure the working hours are adhered to in order to protect this residential amenity.

Construction Methodology

5.10. 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.

Site Logistics

5.11. The Site has been cleared previously and was recently used as storage, site parking and cabin / welfare provision for the Owen Street Development. The existing shed warehouse on Plot F1 will remain in place for phase 1 (construction of tower F2) forming a natural boundary to the north with the remainder of the site being bounded by 6ft ply hoarding (erected at the end of the previous project) and / or the previous permanent chain link fence abutting the footpath on Great Jackson Street.

5.12. There will be gates erected on Owen Street into the F1 plot and these will be served from the opening from Great Jackson Street. It is the intention to stop through traffic down to Owen Street (currently being served by the Old Deansgate end by the majority of traffic to the Deansgate Square turning circle) to give a clear boundary between site and public traffic.

5.13. Site materials will be delivered either through these Owen Street gates for phase 1 or into the existing access onto Great Jackson street servicing currently the completed Owen Street development welfare compound.

5.14. It is envisaged that the temporary site establishment and welfare space will consist of good quality temporary cabins branded with the Renaker Build Limited logo. The welfare facilities will be suitably sized to suit the anticipated number of operatives. The welfare facilities will be located close to the Site.

5.15. Phase 2 of the works (for construction of tower F1), will see the welfare compound and offices moved to an adjacent plot off of Great Jackson street or into the permanent building known as Gaddum House.

5.16. Material storage will be generally contained within the Site & compound boundary with access through the site entrance gates for deliveries. When the concrete frame reaches podium level, small low height forklift trucks will be employed to store materials both within the below ground

floor car parking provision for the façade construction and fit out elements of the works.

5.17. Any temporary public road or footpath closures associated with the construction phase will be agreed with Manchester City Council highways department and relevant diversion signage put in place.

5.18. Access to the Site entrances will be controlled by biometric scanner through a secure metal turnstile. This will monitor Renaker operative's movements and prevent unauthorised public access to the 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 the Site clean and tidy with regular cleaning of Owen Street and Great Jackson Street using road sweepers.

5.20. Loading and unloading of material deliveries will occur within the 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 to prevent vermin.

5.22. The 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 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 site perimeter with associated temporary propping.
- 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 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.
- Installation of BMU.
- Removal of Tower crane.
- Completion of internal finishes to communal space.
- Phased completion of communal external space and links.
- Removal of permanent hoardings and temporary gates.

- Phased completion of public realm and S.278 works.
- Phased decant from site leading to the full opening of the development.

Infrastructure

5.24. The works generally comprise of the following:

- Drainage connections to a new UU main foul drain on Pond Street for phase 1 and Owen Street for Phase 2.
- Rainwater drainage, via approved attenuation system, to an outfall pipe into the River Medlock. This will service both Phase 1 and 2.
- Electrical supply entering at the Owen Street junction and following a designated service route around the perimeter service road to each substation location.
- Mains water will be sourced from the identified supply currently in Great Jackson Street.
- Telecoms and data infrastructure as above.

Traffic Management Plan

5.25. The Site is served well from Great Jackson Street and the privately owned Owen Street. The Mancunian Way is well connected and linked by a short distance to these roads. It is envisaged that deliveries will traverse from the Mancunian Way A57(M) via the slip road onto Garwood Street, then enter the Site at the junction of Great Jackson Street and Owen Street.

5.26. An alternative access and egress point will be along Great Jackson St, then turning into site opposite the warehouse car park. Traffic will return to the Mancunian Way via Garwood Street, Great Jackson Street and Chester Road. Flexibility in the access/egress points from site will minimise congestion on the neighbouring roads. No access to site will be through River Place.

5.27. This approach negates the need for traffic to access via the city centre.

5.28. A full traffic management plan will be developed to address the following:

- 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.

5.29. In preparation of the above document, the Renaker Build Limited 'Protocol of timed and booked deliveries, off peak deliveries and prefabrication' will be incorporated. Further details are provided in Figure 5.1 and 5.2.

Deliveries

5.30. Delivery routes for the major materials and items of plant will be as per the section above, they will access from the south of Owen Street and will endeavour to deliver outside of peak traffic hours to minimise local disruption and the normal workings of the surrounding properties. The concrete supply will be from Renaker's Great Jackson Street batching plant that, due to its very close proximity to the Site, minimises disruption to the road network.

Parking

5.31. There will be a limited number of visitor and key staff parking within the compound area. Site personnel will be encouraged to utilise the extensive public transport options available to them. Any personnel who have to attend by car will be asked to avoid parking in residential areas and instead utilise formal surface car parks within the Great Jackson Street area.

Health and Safety

5.32. The project will be carried out in accordance with the Construction (Design and Management) Regulations 2015, and all other relevant legislation and guidance.

5.33. Renaker Build Limited will be the Principal Contractor. Their track record demonstrates their competency in the management and execution of Health and Safety. Renaker Build Limited have the appropriately trained management resource and procedures in place to oversee the activities of a complex, high rise city centre construction project.

5.34. In its capacity as the Principal Contractor, Renaker Build Limited has worked closely with the Principal Designer throughout pre-application design stages and will influence the detailed design to mitigate construction and residual safety risks.

5.35. 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

5.36. The materials selected at this stage of the design process do not generate a risk to construction personnel using the appropriate PPE and following manufacturers guidance.

Site Security and Safety

5.37. 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 dust & noise control & the erection of perimeter fencing to a specified standard, will be taken.

5.38. Vandalism and theft of plant, equipment, materials and fuel is possible throughout the duration of the development. Renaker Build Limited 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 an individual proximity fob system. In the event of lost or stolen data the system can be updated to prevent fraudulent use.

5.39. The provision of CCTV would be considered if required to main site points and compound areas to assist in the prevention of unauthorised activities.

Environmental Management

5.40. An Environmental Plan, in line with the Renaker Build Limited 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

5.41. 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

5.42. Renaker Build Limited will establish procedures, to ensure the prevention of water and ground pollution, relating to the following risk activities:

- De-watering of the site (if required).
- 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

5.43. 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.

5.44. In order to minimise the noise, Renaker Build Limited will provide the following:

- Any compressors brought on to the 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 minimise noise. Delivery vehicles to be routed so as to minimise disturbance to local residents. Delivery vehicles to be prohibited from waiting within or in the vicinity of the 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 minimised;
- 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.

5.45. In order to minimise the vibration, Renaker Build Limited 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

5.46. 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 none planned on site) piling, moving construction traffic and ground works.

5.47. There are a number of air quality mitigation options available to ensure suitable reductions to air quality impacts as a result of the Proposed Development. Additionally, mitigation measures are required to protect existing receptor locations as a result of fugitive dust emissions and road vehicle exhaust emissions generated by the construction and operational phase of the Proposed Development.

5.48. In order to minimise the dust and fumes, Renaker Build will therefore 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; and,
- Selection of electrically powered plant where possible in lieu of diesel or petrol plant.

5.49. Further details with regard to air quality mitigation during the construction phase is contained within Chapter 6 of this ES (Table 6.24).

Public Relations

5.50. Renaker Build Limited as contractor will ensure that regular contact is made with local residents, land owners, businesses and community groups to ensure they are kept up to date with general progress on the Site. This regular dialogue has taken place during the construction phases of earlier developments. 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 will display a contact number on hoardings which will be operational 24/7.

Waste Management Strategy

5.51. 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 Manchester City Council.

Operational Waste Removal

5.52. 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.

5.53. 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
- CAT D: Plasterboard
- CAT E: General Waste

5.54. All carriers of waste will hold a valid waste transfer licence and provide certification to the main contractor for all elements of the process.

Summary

5.55. 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.

5.56. 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.

5.57. 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.

5.58. 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.

5.59. 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.

5.60. 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 and 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.

5.61. Renaker Build as Main Contractor will enter into dialogue with all relevant parties, including neighbours to ensure there is effective coordination throughout all stages of construction, at the earliest possible stage of the project.

Figure 5.1 and 5.2 – Phasing and Logistics Plan

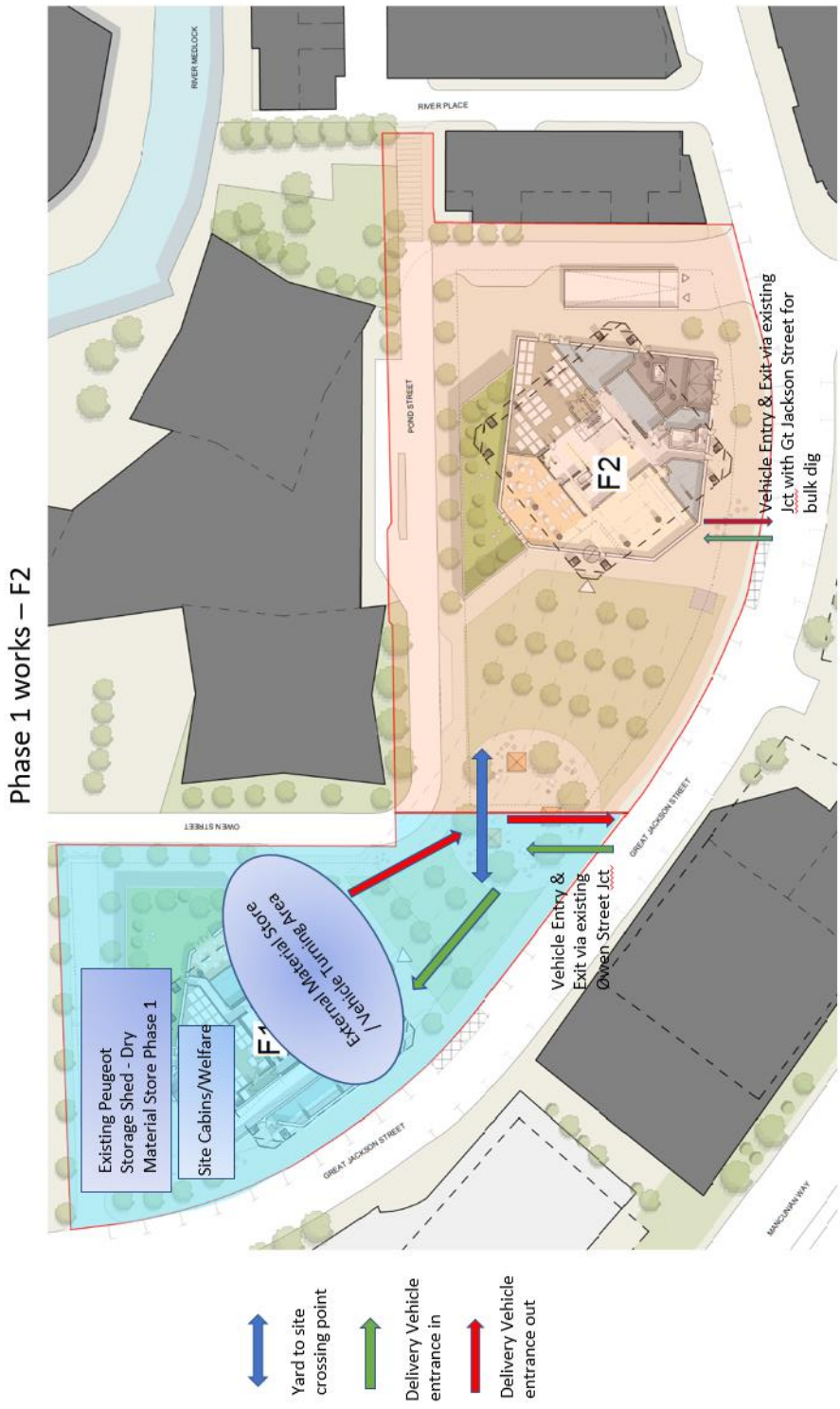


Figure:	5.1		
Title:	Logistics Plan		
Project:	Great Jackson Street Plot F		
Date:	26/07/2021	Scale:	N/A

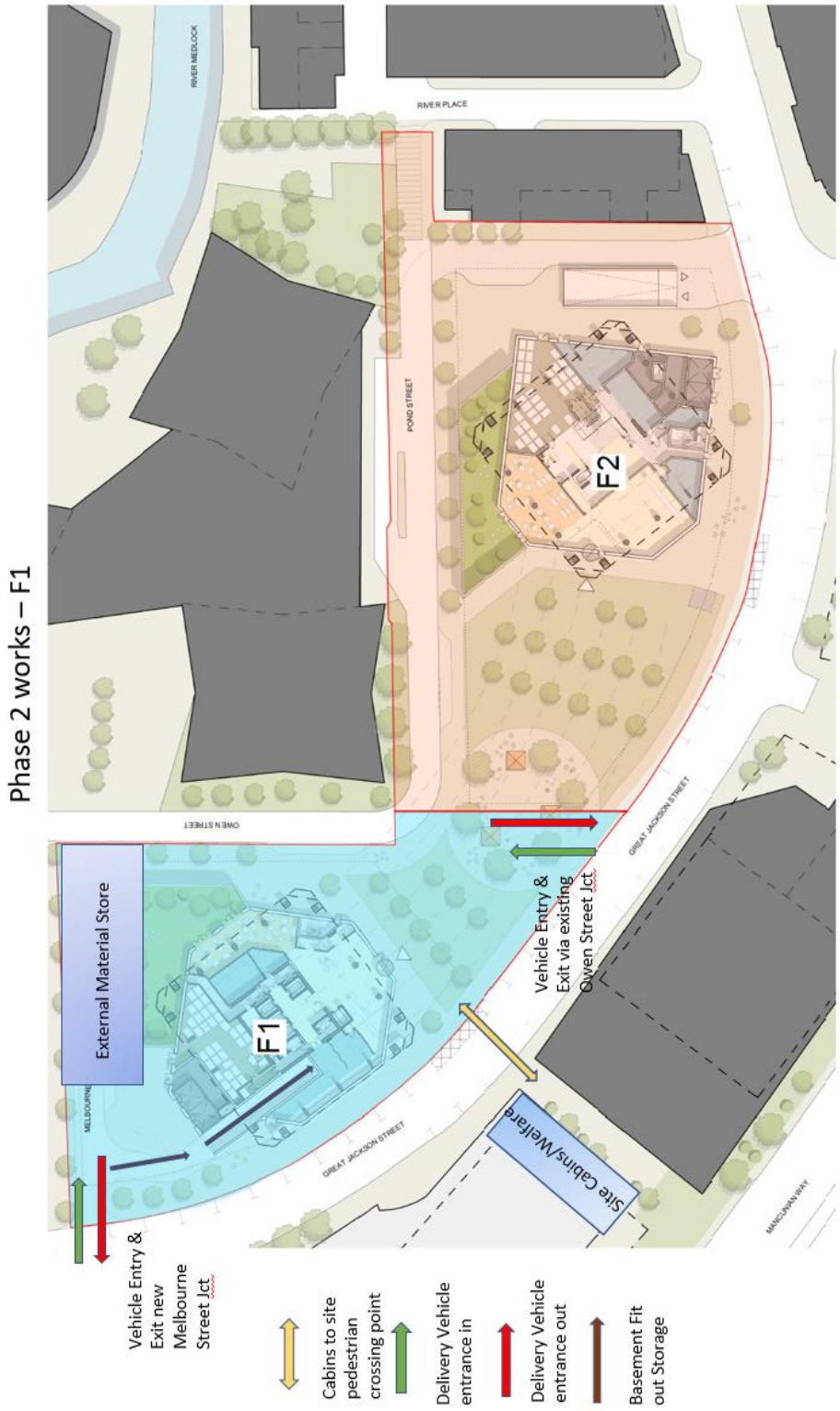


Figure:	5.2		
Title:	Logistics Plan		
Project:	Great Jackson Street Plot F		
Date:	26/07/2021	Scale:	N/A

6. Air Quality

6.1. This Chapter of the Environmental Statement (ES), prepared by Ensafe Consultants, assesses the likely significant effects of the Proposed Development with respect to Air Quality. This Chapter 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; and the likely residual effects after these measures have been adopted.

6.2. The chapter has been prepared with due regard to the requirements of Manchester City Council (MCC) Environmental Health Department. Reference should be made to the following appendices for details of the proposed methodology, assessment inputs, including ADMS-Roads parameters, traffic data and model verification process:

- Appendix 6.1 - Assessment Inputs
- Appendix 6.2 – Figures
- Appendix 6.3 – Construction Phase Assessment Methodology
- Appendix 6.4 – Construction Phase Road Vehicle Exhaust Impact Assessment
- Appendix 6.5 – EIA Qualifications

6.3. The Air Quality Chapter was directed by Josh Davies, Principal Air Quality Consultant at Ensafe Consultants with over 6 years' experience in the air quality sector. His role includes the production and project management of Air Quality Assessments in support of planning applications for a wide range of UK and international clients and sectors, including support on the wider Great Jackson Street Framework. He has detailed knowledge of the Local Air Quality Management (LAQM) regime, Environmental Impact Assessment (EIA) process and co-ordination of multi-disciplinary environmental assessment work in support of planning applications.

Legislative and Policy Context

European Legislation

6.4. European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$).

National Planning Policy

6.5. **The National Planning Policy Framework (NPPF)** – an updated version of the NPPF was published in July 2021 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The implications of the NPPF have been considered throughout this assessment.

6.6. **The National Planning Practice Guidance (NPPG)** - launched by the Department for Communities and Local Government on 6th March 2014 (relevant Air Quality chapters revised 1st November 2019) to support the NPPF. The NPPG will be reviewed, and the relevant guidance considered as

necessary throughout the undertaking of the air quality assessment.

UK Legislation

6.7. **The Air Quality Standards (Amendment) Regulations 2016** - these Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. Air Quality Limit Values (AQLVs) were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

6.8. **Air Quality Strategy (AQS) 2007** - Sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. It also sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems.

6.9. **Part IV of The Environment Act 1995** - requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

National Guidance

6.10. The Chapter was undertaken in accordance with a number of guidance documents as detailed below:

- Department for Environment Food and Rural Affairs (DEFRA) (2016): Local Air Quality
- Management Technical Guidance LAQM TG(16)[2];
- IAQM (2014): Guidance on the Assessment of Dust from Demolition and Construction[3]; and
- IAQM & Environmental Protection UK (EPUK) (2017): Land-use Planning & Development Control: Planning for Air Quality[4].

6.11. Table 6.1 presents the Air Quality Objectives (AQOs) detailed within the relevant legislation, which will be considered further during the preparation of the Air Quality chapter.

Table 6.1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
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

[1] Air Quality Strategy (2007) DEFRA
[2] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)
[3] IAQM (2014): Guidance on the Assessment of Dust from Demolition and Construction construction-dust-2014.pdf (iaqm.co.uk)
[4] Land-Use Planning & Development Control: Planning For Air Quality http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

6.12. Table 6.1 summarises the advice provided in DEFRA guidance LAQM TG(16)[5] on where the AQOs for pollutants considered within this Chapter apply.

Table 6.1 Examples of Where the 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 façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

Local Air Quality Management

6.13. Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of administration under the system of LAQM. This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality

[5] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)

Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

6.14. The Site is located within the Greater Manchester Air Quality Management Area (AQMA), designated due to elevated Nitrogen Dioxide (NO_2) concentrations. Further discussions regarding Air Quality within Manchester City Council is discussed within the baseline conditions section of this chapter.

Local Planning Policy

Manchester City Council Local Plan

6.15. A review of the Core Strategy indicated the following policy in relation to air quality that is relevant to this assessment:

- Policy EN 16 - Air Quality;

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

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

- 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."

6.16. Reference has been made to these policies during the undertaking of this Air Quality Assessment by assessing pollutant concentrations across the Site and determining potential air quality impacts as a result of the Proposed Development.

Greater Manchester Air Quality Action Plan

6.17. The primary objectives of the Greater Manchester Air Quality Action Plan (AQAP)[6] 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.

6.18. 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.

[6] Greater Manchester Air Quality Action Plan
https://secure.manchester.gov.uk/download/downloads/id/24676/greater_manchester_air_quality_action_plan_-_2016-2021.pdf

6.19. Reference has been made to the AQAP during the undertaking of this Air Quality Assessment by assessing pollutant concentrations across the Proposed Development.

Assessment Methodology and Significance Criteria

6.20. The following sections detail the applied assessment methodology for the:

- Construction Phase Assessment; and
- Operational Phase Assessment.

Construction Phase Dust Risk Assessment

6.21. There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction.

6.22. Activities on the Site have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

6.23. The potential for dust emissions was assessed for each activity that is likely to take place and considered 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 PM_{10}.

6.24. A desk top survey will be undertaken to identify human and ecological receptors within the relevant assessment buffers specified by the IAQM guidance[7]. Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

6.25. 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.

6.26. The assigned magnitude and sensitivity will then determine the overall risk and appropriate mitigation measures to be employed during construction phase activities. The full IAQM methodology is provided in Appendix 6.3.

Construction Phase Road Vehicle Impact Assessment

6.27. There is potential for air quality impacts sensitive receptors within close proximity to the Site as

[7] IAQM (2014): Guidance on the Assessment of Dust from Demolition and Construction construction-dust-2014.pdf (iaqm.co.uk)

a result of traffic generated during the construction phase of the development.

6.28. The assessment of construction phase road traffic impacts has considered the following scenarios:

- Anticipated Do Minimum (DM) 2024 predicted baseline flows should the development proposals not proceed, inclusive of all committed developments listed in Appendix 2.1; and
- Anticipated Do Something (DS) 2024 Opening Year, inclusive of all committed developments listed in Appendix 2.1 and predicted traffic flows associated with the construction traffic generation during peak bulk dig phase.

6.29. The existing human receptors in proximity to the Site, set out in Table 6.10, have been used for the assessment of construction traffic emissions. All sensitive receptors within the construction traffic emissions assessment are considered to be of 'high' sensitivity.

Operational Phase Road Vehicle Impact Assessment

6.30. Potential air quality impacts across the Proposed Development and at sensitive receptors within close proximity to the Site have been assessed on a quantitative basis, by calculating NO_2 and PM levels across the Proposed Development and at sensitive locations with and without the development using the ADMS-Roads dispersion modelling software. The ADMS modelling software package is widely accepted within the UK by the Local Authorities, the Environment Agency and DEFRA.

6.31. The assessment of operational phase impacts has considered the following scenarios:

- Scenario 1: Existing Baseline year 2019, for verification purposes against latest 2019 MCC and SCC ratified Air Quality Monitoring data;
- Scenario 5: Anticipated Do Something (DS) 2027 Opening Year baseline plus, predicted traffic flows associated with Phase A and Phase B, basement car park (for both towers), highways, public realm; inclusive of all committed developments listed in Appendix 2.1 (should the proposal be completed).

6.32. The future year scenario will be considered in conjunction with the anticipated 2027 baseline opening year conditions. This is referred to as the Do-Minimum (DM) scenario, where the Proposed Development has not been completed.

6.33. With regards to associated Air Quality impacts, a worst-case operational scenario has been undertaken through the assessment of Scenario 5 which assess the combined impact of all developable aspects as well as specific committed developments listed in Appendix 2.1. The choice of Scenario 5 not only ensures that all development phases are considered in conjunction with baseline committed development traffic flows, but moreover provides a worst-case assessment of development related road vehicle exhaust emissions and takes account of anticipated future traffic generation in the vicinity of the Site.

6.34. Air quality is predicted to improve in the future (due to the current shift towards a greater production and uptake of low emission vehicles, supported by national government targets). However, in order to provide a robust assessment, emission factors for 2019 have been used within the dispersion model. The use of 2027 operational traffic data, together with 2019 emission factors is considered to provide a worst-case scenario which significantly overestimates

potential impacts. A sufficient level of confidence can therefore be placed upon conclusions regarding impact significance.

6.35. Consultation with the Environmental Health Department at MCC confirmed the use of 2019 baseline data. The decision was made considering the effects of COVID-19 on the reliability of 2020 air quality monitoring data. Reference should be made to Appendix 6.1 for details of the consultation.

6.36. NOx and PM factors emission factors have been calculated using the Emission Factor Toolkit (v10.1) produced by DEFRA. Reference should be made to Appendix 6.1 for the assessment input data.

6.37. The Proposed Development includes the provision of basement level car parking which is to be served by ventilation units in order to provide suitable extraction of pollutants. Emissions extracted and released by a number of ventilation units may have the potential to increase pollutant concentration in the vicinity of the proposed residential locations. The impacts associated with the ventilation systems, are considered further throughout the preparation of this Chapter.

Significance Criteria

6.38. Receptors potentially sensitive to changes in NO_2 and PM_{10} concentrations have been identified within 200m of the affected highway network road sources. LAQM (TG16)[8] provides the following examples of where annual mean AQOs should apply:

- Residential properties;
- Schools;
- Hospitals; and,
- Care homes.

6.39. The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 6.2. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and IAQM guidance 'Land-Use Planning and Development Control: Planning for Air Quality.

Table 6.2 Operational Traffic Exhaust Emissions – Assessment of Impact

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
110% or more of AQO	Moderate	Major	Major	Major

[8] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)

6.40. The criteria shown in Table 6.2 is EPUK and IAQM guidance[9] 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%, will be described as negligible in accordance with the EPUK and IAQM guidance[10]. Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 6.2, the EPUK and IAQM[11] document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for.

6.41. Whilst impacts might be determined as 'minor', 'moderate' or 'major' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors are also considered when determining the overall significance of a development in addition to using professional judgement and reasoning as far as practicable:

- 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 major increase or decrease; and,
- The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3.

6.42. These factors were considered, and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

Assumptions and Limitations

Operational Phase Assessment

6.43. For the operational phase assessment, there is current uncertainty over NO_2 concentrations within the UK not reducing as previously expected due to the shifts towards a greater production and uptake of electric and hybrid vehicles.

6.44. In order to provide a robust assessment, emission factors for 2019 were utilised within the dispersion model for the prediction of pollution levels for all future operational scenarios. The use of 2027 traffic data, together with 2019 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted emission levels.

6.45. Similarly, it has been assumed that background concentrations will not improve in line with current predictions and therefore 2019 background concentrations have been utilised for the assessment of the opening year (2027).

[9] Land-Use Planning & Development Control: Planning For Air Quality http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf
[10] Land-Use Planning & Development Control: Planning For Air Quality http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf
[11] ibid

6.46. The limitations stated above are standard limitations associated with atmospheric dispersion modelling assessments. Based on the controls and the application of worse case assumptions it is considered that the assessment is both robust in its conclusions and has been completed in line with current industry standard practice.

Baseline Conditions

6.47. Existing air quality conditions in the vicinity of the Proposed Development were identified in order to provide a baseline for assessment. These are detailed in the following sections.

Local Air Quality Management

6.48. The MCC Review and Assessment of air quality process concluded that annual mean concentrations of NO2 are above the relevant AQO within the city. As such, one AQMA has been declared, which is described as:

- Greater Manchester Combined Authority AQMA (MCC) - "This is the part of the Greater Manchester Combined Authority AQMA located within the Manchester City Council area".

6.49. The Site is located within this AQMA, as such, there is the potential for the Proposed Development to introduce future Site users to elevated pollutant concentrations as well as cause impacts to air quality within the designated AQMA. Potential impacts at sensitive receptor locations within the GMCA AQMA have therefore been considered further within this Chapter.

6.50. MCC has 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.

Air Quality Monitoring

6.51. Monitoring of pollutant concentrations is undertaken by MCC using continuous and periodic methods throughout their area of administration.

6.52. A review of GMCA most recent Air Quality data indicated that there are currently three automatic analysers operated by MCC. The closest of which is the Manchester Oxford Road (Urban traffic analyser), located approximately 1km east of the Site at the NGR: 384233, 397287.

6.53. This monitoring location is classified as a Kerbside site and as such has not been considered further in the context of the assessment or within the verification process. This is in accordance with LAQM (TG16)[12] which suggests that the inclusion of Kerbside sites within the verification procedure may lead to an over-adjustment of modelling at roadside sites. This may then lead to inaccuracies during the modelling of potential exposure across the Proposed Development and potential impacts at nearby sensitive receptor locations.

6.54. MCC also uses passive diffusion tubes to monitor NO_2 concentrations throughout their area of administration. A review of MCC's most recent Air Quality data available indicated that there are four diffusion tubes located in the vicinity of the Proposed Development. Recent monitoring results are summarised in Table 6.3. Exceedances of the relevant AQO are shown in **bold**.

[12] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)

Table 6.3 MCC Diffusion Tube Monitoring Results

MCC ID	MCC Reference	Site Type	NGR (m)		Distance to Site (m)	Monitored Annual Mean NO2 Concentration (µg/m³)		
			X	Y		2017	2018	2019
MAN77	Hewitt Street	Urban Traffic	383602	397488	340	38.81	**40.99**	**43.66**
MAN97	Chester Road	Urban Traffic	382886	397215	558	-	-	32.29
MAN29A	Oxford Street	Urban Traffic	384114	397512	745	**57.7**	**58.8**	**55.4**
MAN82	Manchester Oxford Road	Urban Traffic	384233	397287	796	**56.7**	**51.9**	**51.6**

6.55. The neighbouring Salford City Council (SCC) also undertake Air Quality monitoring within the vicinity of the Site. A review of the latest GMCA monitoring data indicated three representative diffusion tube monitoring locations. Recent results from these locations are shown in Table 6.4. Exceedances of the relevant AQO are highlighted in **bold**.

Table 6.4 SCC Diffusion Tube Monitoring Results

SCC ID	MCC Reference	Site Type	NGR (m)		Distance to Site (m)	Monitored Annual Mean NO_2 Concentration (µg/m³)		
			X	Y		2017	2018	2019
SA81	Regent Road	Roadside	382571	397718	1,021	-	-	**46.41**
SA60	Regent Road	Roadside	382445	397724	1,134	**40.70**	**40.23**	36.66
SA59	West Crown Avenue	Urban Traffic	381822	397895	1,769	36.67	33.31	32.45

6.56. As shown in Table 6.3 and Table 6.4 there were exceedances of the annual mean AQO for NO_2 at various locations across MCC and SCC in recent years. Exceedances are likely due to their kerbside and roadside locations within or adjacent to AQMAs.

6.57. The closest passive diffusion tube monitor is located at Hewitt Street (77), approximately 500m north-east of the Site. This location is classified as a roadside site and situated in similar distance to arterial roads as the Proposed Development. Subsequently, this location will provide a suitable representation for baseline concentration across the Site, as well as during the model verification process.

6.58. Both the Chester Road (MAN97) and Regent Road monitoring locations (SA60 and SA81) are situated in similar distance to arterial roads as the Proposed Development. These locations will provide suitable representation to sensitive receptor locations and similarly will be considered further within the model verification process.

6.59. A review of recent monitoring results within the vicinity of the Site indicated that annual mean NO2 concentrations adjacent to the Site may be marginal to or exceed the AQO. Subsequently, detailed modelling has been produced to assess the risk of on-site exposure to elevated pollutant concentrations.

6.60. Like the Oxford Road analyser, both Oxford Street (29A) and Oxford Road (82) are of kerbside classification and will only be considered further in context of the baseline assessment. The West Crown Avenue monitoring location (SA59) is situated approximately 1,800m away from the Proposed Development and is therefore only considered further in context of the baseline assessment. Subsequently, these locations will not provide a suitable representation for baseline concentrations across the Site and have not been considered further within the Chapter.

6.61. Monitoring of particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}) and 2.5µm ($PM_{2.5}$) is not currently undertaken by MCC or SCC in the vicinity of the Site.

6.62. Reference should be made to Figure 6.1 for geographical representation of diffusion tube monitoring locations.

Background Pollutant Concentrations

6.63. The total concentration of a pollutant is comprised of explicit local emission sources (such as roads and industrial sources) and the background component. The background component consists of indeterminate sources which are transported into an area from further away by meteorological conditions. Background pollutant concentrations are therefore the ambient level of pollution that is not affected by local sources of pollution.

6.64. Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Authorities (LAs) in their Review and Assessment of air quality. The Proposed Development is located in the background grid square:

- 383500, 397500.

6.65. Data for this location was downloaded from the DEFRA website for the purpose of this assessment and is summarised in Table 6.5; for the baseline year (2019) and Opening year (2027).

6.66. In order to avoid 'double-counting' of road vehicle exhaust emissions of NO_2 and NO_x, the proportion of the relevant background concentrations from Motorways In, Trunk A-roads In and Primary A-roads In were removed in accordance with the methodology outlined in DEFRA guidance LAQM.TG(16)[13]. The background concentrations following adjustment by the "NO_x Removal Calculator" are presented in Table 6.5. Both PM_{10} and $PM_{2.5}$ background concentrations are unaffected by this process.

Table 6.5 Predicted Background Pollutant Concentrations

Pollutant	Predicted Annual Mean Pollutant Concentration (µg/m³)	
	2019	2027
NO_x	33.56	27.70

[13] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)

Pollutant	Predicted Annual Mean Pollutant Concentration (µg/m³)	
	2019	2027
NO_2	22.52	19.12
PM_{10}	13.47	12.54
$PM_{2.5}$	8.69	8.02

6.67. As shown in Table 6.5 background concentrations of NO_2, PM_{10} and $PM_{2.5}$ are not predicted to exceed the relevant AQOs in the baseline or opening year scenarios. Comparison between the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations, specifically adjacent to arterial traffic routes within an AQMA.

Sensitive Receptors

6.68. A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a Proposed Development. These have been defined for fugitive dust and road vehicle exhaust emission impacts associated with the construction and operational phases. These are summarised in the following Sections.

Construction Phase Sensitive Receptors – Human Receptors

6.69. Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the Site boundary. These are summarised in Table 6.6.

Table 6.6 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary(m)	Approximate Number of Human Receptors	Sensitivity
Less than 20	More than 100	High
20 - 50	More than 100	
50 - 100	More than 100	
100 - 350	More than 100	

6.70. Reference should be made to Figure 6.2 of Appendix 6.2 which provides a graphical representation of demolition, earthworks and construction dust buffer zones.

6.71. Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the Site access route. These are summarised in Table 6.7. It has been confirmed that construction traffic would likely access the Site from Mancunian Way or from east or west of Great Jackson Street, utilising Bridgewater Way, Medlock Street and the Mancunian Way. This will ensure that a maximum potential trackout distance is considered.

Table 6.7 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Sensitivity
Less than 20	More than 100	High
20 - 50	More than 100	

6.72. Reference should be made to Figure 6.3 within Appendix 6.3 for a graphical representation of trackout dust buffer zones.

Construction Phase – Ecological Receptors

6.73. There are no local or nationally designated ecological receptors within 50m of the Site or trackout boundaries. As such, construction phase impacts relating to ecological impacts have not been assessed further within this Chapter.

Additional Area Sensitivity Factors

6.74. A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 6.8.

Table 6.8 Additional Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The Site is located within a residential area undergoing significant regeneration. As such, historical dust generation may have occurred as a result of windblown emissions from regeneration, specifically as a result of construction phase processes.
The likelihood of concurrent dust generating activity on nearby sites	As provided in Appendix 2.1: Committed Developments, a review of the MCC planning portal indicated that there are a series of planning permissions are within 500m of the Proposed Development boundary. A full list of committed developments within 500m of the Site are provided in Appendix 2.1. Due to the size and nature of the committed developments, there is a risk of concurrent dust generating activity should the construction phases overlap.
Pre-existing screening between the source and the receptors	There is no vegetation present along the northern and western boundaries of The Site. As such, pre-existing protective screening is limited.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south of the Proposed Development, as shown in Figure 6.4 with Appendix 6.2. As such, properties to the north would be most affected by dust emissions.
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion.

Guidance	Comment
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is anticipated that the proposed completion date will be approximately Q3 2027.
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline.

Operational Phase – Human Receptors

6.75. A desk-top study was undertaken in order to identify off-Site sensitive receptor locations within 200m of the affected highway network that require specific consideration during the assessment. The list of receptors is not considered to be exhaustive instead they are 'worst-case' receptors representative of their immediate environments. These were modelled at relevant heights to represent worse case exposure and are summarised in Table 6.9 and presented in Figure 6.6 of Appendix 6.2.

Table 6.9 Existing Sensitive Human Receptors

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Chester Road	382654.0	397099.0	1.5
R2	Residential - Chester Road	382887.0	397207.0	1.5
R3	Residential - Chester Road	382936.0	397225.0	4.5
R4	Residential - Chester Road	382854.0	397237.0	1.5
R5	Residential - Chester Road	382912.0	397297.0	1.5
R6	Residential - Chester Road	382912.0	397297.0	3.5
R7	Residential - Egerton Street	382973.0	397347.0	4.5
R8	Residential - Egerton Street	382973.0	397347.0	8.0
R9	Residential - Egerton Street	382912.0	397396.0	5.5
R10	Residential - Egerton Street	382912.0	397396.0	8.0
R11	Residential - Egerton Street	382786.0	397441.0	0.5
R12	Residential - Mancunian Way	383251.0	397127.0	1.5
R13	Residential - Chester Road	383216.0	397424.0	1.5
R14	Residential - City Road East	383502.0	397254.0	5.5

Receptor		NGR (m)		Height (m)
		X	Y	
R15	Residential - City Road East	383556.0	397281.0	3.0
R16	Residential - City Road East	383588.0	397372.0	1.5
R17	Residential - Albion Street	383610.0	397476.0	4.5
R18	Residential - Albion Street	383651.6	397543.1	4.5
R19	Residential - Old Deansgate	383357.0	397450.2	2.5
R20	Residential - Bridgewater Viaduct	383305.5	397447.4	0.5
R21	Residential - Owens Street	383316.6	397400.8	1.5
R22	Residential - Owens Street	383341.1	397414.5	1.5
R23	Residential - Whitworth Street East	383715.1	397519.4	4.0
R24	Commercial - Great Jackson Street	383281.0	397197.0	1.5
R25	Commercial - Egerton Street	382864.7	397438.3	1.5
R26	Commercial - Egerton Street	382864.7	397438.3	3.1
R27	Commercial - Gaddum House	383236.7	397312.6	1.5
R28	Residential - Silvercroft Street	383100.4	397286.8	1.5
R29	Residential - Silvercroft Street	383145.5	397306.8	1.5
R30	Residential - Silvercroft Street	383092.1	397291.0	5.1
R31	Residential - Silvercroft Street	383128.2	397326.1	5.1
R32	Residential - Silvercroft Street	383160.7	397307.5	5.1
R33	Residential - Silvercroft Street	383201.3	397367.3	1.5
R34	Educational - Crown Street Phase 2	383108.7	397244.6	1.5
R35	Residential - Crown Street Phase 3	383127.2	397233.9	1.5
R36	Residential - Crown Street Phase 4	383190.8	397206.9	1.5
R37	Residential – Deansgate Square South Tower	383391.9	397252.1	1.5
R38	Residential - Castle Wharf	383254.4	397442.1	8.0
R39	Residential - Castle Wharf	383286.7	397469.2	7.0

Operational Phase – Ecological Receptors

6.76. There are no local or nationally designated ecological receptors within 2,000m of the Site or trackout boundaries. As such, operational phase impacts relating to ecological impacts have not been assessed further within this Chapter.

Operational Phase – Human Receptors

6.77. A desk-top study was undertaken in order to identify off-Site sensitive receptor locations within 200m of the affected highway network that require specific consideration during the assessment. The list of receptors is not considered to be exhaustive instead they are 'worst-case' receptors representative of their immediate environments. These were modelled at relevant heights to represent worse case exposure and are summarised in Table 6.10 and presented in Figure 6.6 of Appendix 6.2.

Table 6.10 Existing Sensitive Human Receptors

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Chester Road	382654.0	397099.0	1.5
R2	Residential - Chester Road	382887.0	397207.0	1.5
R3	Residential - Chester Road	382936.0	397225.0	4.5
R4	Residential - Chester Road	382854.0	397237.0	1.5
R5	Residential - Chester Road	382912.0	397297.0	1.5
R6	Residential - Chester Road	382912.0	397297.0	3.5
R7	Residential - Egerton Street	382973.0	397347.0	4.5
R8	Residential - Egerton Street	382973.0	397347.0	8.0
R9	Residential - Egerton Street	382912.0	397396.0	5.5
R10	Residential - Egerton Street	382912.0	397396.0	8.0
R11	Residential - Egerton Street	382786.0	397441.0	0.5
R12	Residential - Mancunian Way	383251.0	397127.0	1.5
R13	Residential - Chester Road	383216.0	397424.0	1.5
R14	Residential - City Road East	383502.0	397254.0	5.5
R15	Residential - City Road East	383556.0	397281.0	3.0
R16	Residential - City Road East	383588.0	397372.0	1.5
R17	Residential - Albion Street	383610.0	397476.0	4.5

Receptor		NGR (m)		Height (m)
		X	Y	
R18	Residential - Albion Street	383651.6	397543.1	4.5
R19	Residential - Old Deansgate	383357.0	397450.2	2.5
R20	Residential - Bridgewater Viaduct	383305.5	397447.4	0.5
R21	Residential - Owens Street	383316.6	397400.8	1.5
R22	Residential - Owens Street	383341.1	397414.5	1.5
R23	Residential - Whitworth Street East	383715.1	397519.4	4.0
R24	Commercial - Great Jackson Street	383281.0	397197.0	1.5
R25	Commercial - Egerton Street	382864.7	397438.3	1.5
R26	Commercial - Egerton Street	382864.7	397438.3	3.1
R27	Commercial - Gaddum House	383236.7	397312.6	1.5
R28	Residential - Silvercroft Street	383100.4	397286.8	1.5
R29	Residential - Silvercroft Street	383145.5	397306.8	1.5
R30	Residential - Silvercroft Street	383092.1	397291.0	5.1
R31	Residential - Silvercroft Street	383128.2	397326.1	5.1
R32	Residential - Silvercroft Street	383160.7	397307.5	5.1
R33	Residential - Silvercroft Street	383201.3	397367.3	1.5
R34	Educational - Crown Street Phase 2	383108.7	397244.6	1.5
R35	Residential - Crown Street Phase 3	383127.2	397233.9	1.5
R36	Residential - Crown Street Phase 4	383190.8	397206.9	1.5
R37	Residential – Deansgate Square South Tower	383391.9	397252.1	1.5
R38	Residential - Castle Wharf	383254.4	397442.1	8.0
R39	Residential - Castle Wharf	383286.7	397469.2	7.0

Operational Phase – Ecological Receptors

6.78. There are no local or nationally designated ecological receptors within 2,000m of the Site or trackout boundaries. As such, operational phase impacts relating to ecological impacts have not been assessed further within this Chapter.

Identification and Evaluation of Significant Effects

Construction Phase

Step 1 – Screening

6.79. The results of the desk-study detailed in Table 6.6 and Table 6.7 identified a number of sensitive human receptors within 350m of the Site boundary, and within 50m of the anticipated trackout routes.

Step 2A – Identification of Magnitude

6.80. The scale and nature of the works was determined to assess the magnitude of dust arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix 6.3 and summarised below in Table 6.11.

Demolition

6.81. Based on the floorspace and height, the volume of buildings to be demolished is likely to be less than 20,000m^3. Considering the scale of demolition and implementation of good practice dust suppression techniques, the magnitude of potential dust emissions related to demolition activities is small.

Earthworks

6.82. The area of the Proposed Development Site (approx. 8,780m^2) combined with the made ground determined a large magnitude related to earthwork activities.

Construction

6.83. Given the scale of the Proposed Development the approximate total building volume is greater than 100,000m3. The magnitude of construction activities is therefore considered large.

Trackout

6.84. Up to 70 daily HGV movements are anticipated during peak building phase. Based on the Site area, it is anticipated that the unpaved road length is likely to be between 50 and 100m. The magnitude of potential dust emissions from trackout is therefore medium.

Table 6.11 Dust Emission Magnitude

Magnitude of Activity			
Demolition	**Earthworks**	**Construction**	**Trackout**
Small	**Large**	**Large**	**Medium**

Step 2B – Sensitivity

6.85. The next step (Step 2B) is to determine the sensitivity of the surrounding area, based on general principles such as amenity and aesthetics, as well as human exposure sensitivity.

Dust Soling

6.86. As shown in Table 6.6 and Table 6.7, the desk top study indicated that approximately more than 100 sensitive receptors are within 20m of the Proposed Development boundary, and

20m of the anticipated trackout routes.

6.87. The sensitivity of the receiving environment to potential dust soiling impacts was considered to be high for all construction activities.

Human Health

6.88. The annual mean concentration of PM_{10} is less than 24 µg/m3 as detailed in Table 6.5.

6.89. The presence of More than 100 sensitive receptors within 20m of the Proposed Development, and 20m of the anticipated trackout routes, the area is considered to be of high sensitivity for demolition, earthwork and construction activities and moderate sensitivity for trackout activities.

6.90. The sensitivity of the receiving environment is shown in Table 6.12.

Table 6.12 Sensitivity of Surrounding Area

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Moderate	Moderate	Moderate	Moderate

Step 2C – Summary of the Risk of Dust Effects

6.91. Both the magnitude and sensitivity factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures. A summary of the risk from each dust generating activity is provided in Table 6.13.

Table 6.13 Summary of Unmitigated Dust Risks

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

Step 3 – Mitigation

6.92. The IAQM guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the Site as summarised in Table 6.24. A review of these measures will be required prior to the commencement of construction works and incorporated into existing strategies where practical.

Stage 4 – Residual Impacts

6.93. Assuming that all relevant mitigation measures outlined in Table 6.24 are implemented effectively, the effect from all dust generation activities is predicted to be negligible and

not significant.

Operational Phase Assessment

6.94. As discussed in the methodology section of this Chapter, additional vehicle movements associated with the operation of the Proposed Development will generate exhaust emissions, such as NO_2 and PM_{10}, on the local and regional road networks.

6.95. Operational Traffic data for the assessment scenarios has been supplied by Curtins, the appointed Transport Consultant for the scheme. Traffic data for the construction phase was informed by the Applicant (Renaker Build (Renaker) Ltd).

Construction Phase Traffic Generation

6.96. Construction for the two development blocks is due to commence in 2022 for Block F1 and 2024 for Block F2. To provide a robust assessment, which assess peak construction phase traffic, 2024 traffic data was used alongside 2019 emissions factors within the dispersion modelling.

6.97. Based on the information provided the Applicant, it is forecasted that the maximum number of vehicles travelling to the Site during the construction phase is 90 AADT (77.8% HGV) during the Peak Bulk digging phase of the development. During the steady state phase of the development (Frame construction, façade and fit out) the number of construction vehicles is set to reduce to a maximum of 28 AADT (28.6% HGV) per day. Subsequently 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.

6.98. Predicted impacts on annual mean NO_2 concentrations as a result of construction phase exhaust emissions were predicted to be **negligible** at 37 sensitive receptor locations, **minor adverse** at one sensitive receptor and **moderate adverse** at one sensitive receptor within the vicinity of the site. Impacts on PM_{10} and $PM_{2.5}$ were predicted to be **negligible** at all 39 sensitive receptor locations considered.

6.99. HGV movements during the construction phase have been assessed using worse case peak movements. It should be noted that daily HGV movements will significantly reduce during the frame construction, façade and fit with peak movements only present during 2024.

6.100. Given their transient and short-term presence and **minor adverse** impact upon the network associated impact significance can therefore be considered not significant with regard to long-term pollutant concentrations.

6.101. As such, the overall significance of potential impacts was determined to be **not significant** in accordance with the EPUK and IAQM guidance. The use of robust assumptions, in the form of worse-case road vehicle emission factors, was considered to provide sufficient results confidence for an assessment of this nature.

6.102. Full assessment results and commentary can be found in Appendix 6.4.

Predicted Annual Mean Concentrations at the Development Site

6.103. Annual mean NO_2 concentrations were predicted at sensitive uses across the Site for DS scenarios at the following building heights to represent exposure in 2027 across the ground to first floor levels of the Proposed Development:

- Ground Floor Level 00 (1.5m); and
- First Floor Level 01 (10.5m).

6.104. Reference should be made to Figures 6.7 to 6.10 within Appendix 6.2 for a graphical representation of contour plots for the predicted 2027 annual mean concentrations. Floor heights provided by the architect provide an accurate representation of pollutant exposure across each assessed floor level.

6.105. Background NO_2 and PM levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. Therefore, predicted concentrations at heights above first floor level has not been assessed further.

Annual Mean Nitrogen Dioxide – NO_2

6.106. Predicted annual mean NO_2 concentrations across sensitive uses within the Site for the 2027 DS scenario are summarised in Table 6.14.

Table 6.14 Predicted Annual Mean NO_2 Concentrations

Floor Level (m)	Predicted Annual Mean NO_2 Concentration Range (µg/m³)	
	Building F1	**Building F2**
Ground Floor Level 00 (1.5m)	31.33 – 37.14	30.69 – 34.13
Level 01 (10.5m)	29.07 – 30.11	28.91 – 30.22

6.107. As indicated in Table 6.15 predicted NO_2 concentrations did not exceeded the annual mean AQO at any sensitive locations areas of the ground or level 01 of both Building F1 and Building F2.

6.108. Predictions of 1-hour NO_2 concentrations were not produced as part of the dispersion modelling assessment. LAQM (TG16)[14] states if annual mean NO_2 concentrations are below 60µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. Based on the results in Table 6.15, it is not predicted that on-site concentrations will exceed the 1-hour mean AQO for NO_2.

6.109. Based on the results of the dispersion modelling assessment, the Site is suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated annual mean NO_2 concentrations.

Predicted Annual Mean concentrations at Sensitive Receptors

6.110. Annual mean NO_2 concentrations were predicted at existing off-Site sensitive receptors to assess the impact of the Proposed Development on the surrounding environment. Analysis for the DM and DS scenarios are summarised in Table 6.15. Exceedances of the relevant AQO are highlighted in **bold**.

[14] Local Air Quality Management Technical Guidance (TG16) February 2018 LAQM-TG16-February-18-v1.pdf (defra.gov.uk)

Table 6.15 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration Range (m^3/m^3)		
		DM	DS	Change
R1	Residential - Chester Road	28.86	28.97	0.11
R2	Residential - Chester Road	30.63	30.74	0.11
R3	Residential - Chester Road	30.79	30.89	0.10
R4	Residential - Chester Road	**52.46**	**52.79**	0.33
R5	Residential - Chester Road	39.54	39.71	0.17
R6	Residential - Chester Road	38.07	38.23	0.16
R7	Residential - Egerton Street	**47.07**	**47.28**	0.21
R8	Residential - Egerton Street	36.87	37.01	0.14
R9	Residential - Egerton Street	38.96	39.08	0.12
R10	Residential - Egerton Street	33.73	33.81	0.08
R11	Residential - Egerton Street	29.05	29.11	0.06
R12	Residential - Mancunian Way	30.94	30.98	0.04
R13	Residential - Chester Road	38.64	38.95	0.31
R14	Residential - City Road East	31.11	31.22	0.11
R15	Residential - City Road East	30.48	30.59	0.11
R16	Residential - City Road East	31.04	31.31	0.27
R17	Residential - Albion Street	33.01	33.13	0.12
R18	Residential - Albion Street	31.43	31.50	0.07
R19	Residential - Old Deansgate	30.80	31.12	0.32
R20	Residential - Bridgewater Viaduct	32.66	32.95	0.29
R21	Residential - Owens Street	29.70	30.12	0.42
R22	Residential - Owens Street	29.93	30.22	0.29
R23	Residential - Whitworth Street East	30.53	30.61	0.08
R24	Commercial - Great Jackson Street	**42.70**	**42.78**	0.08

Receptor		Predicted Annual Mean NO_2 Concentration Range (m^3/m^3)		
		DM	DS	Change
R25	Commercial - Egerton Street	**51.21**	**51.40**	0.19
R26	Commercial - Egerton Street	**46.49**	**46.65**	0.16
R27	Commercial - Gaddum House	31.37	31.44	0.07
R28	Residential - Silvercroft Street	37.83	37.94	0.11
R29	Residential - Silvercroft Street	33.11	33.20	0.09
R30	Residential - Silvercroft Street	36.97	37.08	0.11
R31	Residential - Silvercroft Street	33.56	33.68	0.12
R32	Residential - Silvercroft Street	31.74	31.82	0.08
R33	Residential - Silvercroft Street	34.93	35.07	0.14
R34	Educational - Crown Street Phase 2	**44.54**	**44.64**	0.10
R35	Residential - Crown Street Phase 2	**44.75**	**44.85**	0.10
R36	Residential - Crown Street Phase 2	**47.68**	**47.80**	0.12
R37	Residential - Deansgate Square South Tower	31.68	32.03	0.35
R38	Residential - Castle Wharf	30.72	30.88	0.16
R39	Residential - Castle Wharf	30.99	31.16	0.17

6.111. As indicated in Table 6.16, predicted annual mean NO_2 concentrations exceeded the relevant AQO at 8 sensitive receptor locations during both the DM and DS scenarios. This is likely due to their roadside locations within an AQMA, at areas within close proximity to arterial junctions where slow speeds and idling vehicles are often present, particularly during peak hours.

6.112. No new exceedances of the AQO are anticipated to arise as a result of the Proposed Development. The remaining 31 receptor locations were predicted to experience NO_2 concentrations below the relevant AQO.

6.113. The significance of potential impacts is considered further in Table 6.16 and is based on the criteria provided within Table 6.3.

Table 6.16 Predicted Annual Mean NO_2 Impacts

Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R1	Residential - Chester Road	0.27	75% or Less of AQO	Negligible
R2	Residential - Chester Road	0.27	76-94% of AQO	Negligible
R3	Residential - Chester Road	0.25	76-94% of AQO	Negligible
R4	Residential - Chester Road	0.82	110+ of AQO	**Moderate Adverse**
R5	Residential - Chester Road	0.43	95-102% of AQO	Negligible
R6	Residential - Chester Road	0.40	95-102% of AQO	Negligible
R7	Residential - Egerton Street	0.53	110+ of AQO	**Moderate Adverse**
R8	Residential - Egerton Street	0.35	76-94% of AQO	Negligible
R9	Residential - Egerton Street	0.30	95-102% of AQO	Negligible
R10	Residential - Egerton Street	0.20	76-94% of AQO	Negligible
R11	Residential - Egerton Street	0.15	75% or Less of AQO	Negligible
R12	Residential - Mancunian Way	0.10	76-94% of AQO	Negligible
R13	Residential - Chester Road	0.78	95-102% of AQO	Minor Adverse
R14	Residential - City Road East	0.27	76-94% of AQO	Negligible
R15	Residential - City Road East	0.27	76-94% of AQO	Negligible
R16	Residential - City Road East	0.67	76-94% of AQO	Negligible
R17	Residential - Albion Street	0.30	76-94% of AQO	Negligible
R18	Residential - Albion Street	0.18	76-94% of AQO	Negligible
R19	Residential - Old Deansgate	0.80	76-94% of AQO	Negligible
R20	Residential - Bridgewater Viaduct	0.73	76-94% of AQO	Negligible
R21	Residential - Owens Street	1.05	75% or Less of AQO	Negligible
R22	Residential - Owens Street	0.72	75% or Less of AQO	Negligible
R23	Residential - Whitworth Street East	0.20	76-94% of AQO	Negligible
R24	Commercial - Great Jackson Street	0.20	103-109% of AQO	Negligible
R25	Commercial - Egerton Street	0.47	110+ of AQO	Negligible

Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R26	Commercial - Egerton Street	0.40	110+ of AQO	Negligible
R27	Commercial - Gaddum House	0.18	76-94% of AQO	Negligible
R28	Residential - Silvercroft Street	0.27	95-102% of AQO	Negligible
R29	Residential - Silvercroft Street	0.23	76-94% of AQO	Negligible
R30	Residential - Silvercroft Street	0.27	76-94% of AQO	Negligible
R31	Residential - Silvercroft Street	0.30	76-94% of AQO	Negligible
R32	Residential - Silvercroft Street	0.20	76-94% of AQO	Negligible
R33	Residential - Silvercroft Street	0.35	76-94% of AQO	Negligible
R34	Educational - Crown Street Phase 2	0.25	110+ of AQO	Negligible
R35	Residential - Crown Street Phase 2	0.25	110+ of AQO	Negligible
R36	Residential - Crown Street Phase 2	0.30	110+ of AQO	Negligible
R37	Residential - Deansgate Square South Tower	0.88	76-94% of AQO	Negligible
R38	Residential - Castle Wharf	0.40	76-94% of AQO	Negligible
R39	Residential - Castle Wharf	0.43	76-94% of AQO	Negligible

6.114. As indicated in Table 6.16, impacts on annual mean NO_2 concentrations as a result of road vehicle exhaust emissions associated with the Proposed Development are predicted to be **negligible** at 36 sensitive receptor locations, **minor adverse** at 1 location and **moderate adverse** at 2 sensitive receptor locations.

6.115. With regards to associated impacts, worst-case sensitivity analysis has been provided in the form of emission factors. The use of 2027 operational traffic data, together with 2019 emission factors is considered to provide a worst-case scenario which significantly overestimates potential impacts. Moreover, this approach does not consider future improvements due to a shift towards a greater production and uptake low emission and electric vehicles guided by government policy and the MCC AQAP.

6.116. The MCC AQAP 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. Both receptor locations (R4 and R7) are located directly adjacent to the A57(M) and A56, respectively. It is expected that the AQAP will improve baseline Air Quality in these heavily trafficked areas. The worst case assessment using 2019 emission factors is therefore a significant overestimation of conditions during operations during 2027.

6.117. Based on the results, the overall impact significance upon annual mean NO_2 concentrations as a

result of the Proposed Development was determined to be of **minor adverse**. Further discussion on this conclusion is provided in Table 6.24. The scheme will also provide a mitigation strategy to offset operational road vehicle exhaust emissions this is referred to in Table 6.24.

Annual Mean Particulate Matter– PM_{10}

Predicted Annual Mean Concentrations at the Development Site

6.118. Predicted annual mean PM_{10} concentrations across sensitive uses within the Site for the 2027 DS scenario are summarised in Table 6.17.

Table 6.17 Predicted Annual Mean PM10 Concentrations

Floor Level (m)	Predicted Annual Mean PM_{10} Concentration Range ($\mu g/m^3$)	
	Building F1	Building F2
Ground Floor Level 00 (1.5)	**15.29 – 16.49**	**15.14 – 15.87**

6.119. As indicated in Table 6.18 predicted PM_{10} concentrations do not exceed the annual mean AQO across the ground floor level of either Building F1 and Building F2.

6.120. Based on the results of the dispersion modelling assessment, the Site is suitable for proposed end use without the implementation of mitigation techniques to protect future Site users from elevated annual mean PM_{10} concentrations.

Predicted Annual Mean concentrations at Sensitive Receptors

6.121. Predicted annual mean PM_{10} concentrations for the DM and DS scenarios are summarised in Table 6.18.

Table 6.18 Predicted Annual Mean PM10 Concentrations

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration Range ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - Chester Road	14.94	14.96	0.02
R2	Residential - Chester Road	14.93	14.95	0.02
R3	Residential - Chester Road	15.03	15.05	0.02
R4	Residential - Chester Road	18.08	18.14	0.06
R5	Residential - Chester Road	16.46	16.49	0.03
R6	Residential - Chester Road	16.22	16.24	0.02
R7	Residential - Egerton Street	18.32	18.36	0.04
R8	Residential - Egerton Street	16.33	16.35	0.02

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration Range ($\mu g/m^3$)		
		DM	DS	Change
R9	Residential - Egerton Street	17.08	17.11	0.03
R10	Residential - Egerton Street	15.90	15.92	0.02
R11	Residential - Egerton Street	15.03	15.04	0.01
R12	Residential - Mancunian Way	15.25	15.25	0.00
R13	Residential - Chester Road	16.54	16.61	0.07
R14	Residential - City Road East	15.21	15.23	0.02
R15	Residential - City Road East	15.06	15.09	0.03
R16	Residential - City Road East	15.09	15.13	0.04
R17	Residential - Albion Street	15.35	15.37	0.02
R18	Residential - Albion Street	15.11	15.12	0.01
R19	Residential - Old Deansgate	15.10	15.16	0.06
R20	Residential - Bridgewater Viaduct	15.42	15.48	0.06
R21	Residential - Owens Street	14.87	14.95	0.08
R22	Residential - Owens Street	14.92	14.98	0.06
R23	Residential - Whitworth Street East	14.85	14.86	0.01
R24	Commercial - Great Jackson Street	18.01	18.03	0.02
R25	Commercial - Egerton Street	20.45	20.50	0.05
R26	Commercial - Egerton Street	19.17	19.21	0.04
R27	Commercial - Gaddum House	15.22	15.24	0.02
R28	Residential - Silvercroft Street	16.55	16.57	0.02
R29	Residential - Silvercroft Street	15.55	15.57	0.02
R30	Residential - Silvercroft Street	16.33	16.35	0.02
R31	Residential - Silvercroft Street	15.57	15.60	0.03
R32	Residential - Silvercroft Street	15.29	15.30	0.01
R33	Residential - Silvercroft Street	15.76	15.79	0.03

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration Range ($\mu g/m^3$)		
		DM	DS	Change
R34	Educational - Crown Street Phase 2	18.33	18.35	0.02
R35	Residential - Crown Street Phase 2	18.43	18.45	0.02
R36	Residential - Crown Street Phase 2	19.23	19.26	0.03
R37	Residential - Deansgate Square South Tower	15.37	15.44	0.07
R38	Residential - Castle Wharf	15.02	15.05	0.03
R39	Residential - Castle Wharf	15.08	15.11	0.03

6.122. As indicated in Table 6.18, predicted annual mean PM_{10} concentrations do not exceeded the relevant AQO at any sensitive receptor locations, in both the DM and DS scenarios.

6.123. The significance of potential impacts is considered further in Table 6.19.

Table 6.19 Predicted Annual Mean PM_{10} Impacts

Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R1	Residential - Chester Road	0.05	75% or Less of AQO	Negligible
R2	Residential - Chester Road	0.05	75% or Less of AQO	Negligible
R3	Residential - Chester Road	0.05	75% or Less of AQO	Negligible
R4	Residential - Chester Road	0.15	75% or Less of AQO	Negligible
R5	Residential - Chester Road	0.07	75% or Less of AQO	Negligible
R6	Residential - Chester Road	0.05	75% or Less of AQO	Negligible
R7	Residential - Egerton Street	0.10	75% or Less of AQO	Negligible
R8	Residential - Egerton Street	0.05	75% or Less of AQO	Negligible
R9	Residential - Egerton Street	0.08	75% or Less of AQO	Negligible
R10	Residential - Egerton Street	0.05	75% or Less of AQO	Negligible
R11	Residential - Egerton Street	0.02	75% or Less of AQO	Negligible
R12	Residential - Mancunian Way	0.00	75% or Less of AQO	Negligible
R13	Residential - Chester Road	0.18	75% or Less of AQO	Negligible

Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R14	Residential - City Road East	0.05	75% or Less of AQO	Negligible
R15	Residential - City Road East	0.07	75% or Less of AQO	Negligible
R16	Residential - City Road East	0.10	75% or Less of AQO	Negligible
R17	Residential - Albion Street	0.05	75% or Less of AQO	Negligible
R18	Residential - Albion Street	0.02	75% or Less of AQO	Negligible
R19	Residential - Old Deansgate	0.15	75% or Less of AQO	Negligible
R20	Residential - Bridgewater Viaduct	0.15	75% or Less of AQO	Negligible
R21	Residential - Owens Street	0.20	75% or Less of AQO	Negligible
R22	Residential - Owens Street	0.15	75% or Less of AQO	Negligible
R23	Residential - Whitworth Street East	0.02	75% or Less of AQO	Negligible
R24	Commercial - Great Jackson Street	0.05	75% or Less of AQO	Negligible
R25	Commercial - Egerton Street	0.13	75% or Less of AQO	Negligible
R26	Commercial - Egerton Street	0.10	75% or Less of AQO	Negligible
R27	Commercial - Gaddum House	0.05	75% or Less of AQO	Negligible
R28	Residential - Silvercroft Street	0.05	75% or Less of AQO	Negligible
R29	Residential - Silvercroft Street	0.05	75% or Less of AQO	Negligible
R30	Residential - Silvercroft Street	0.05	75% or Less of AQO	Negligible
R31	Residential - Silvercroft Street	0.07	75% or Less of AQO	Negligible
R32	Residential - Silvercroft Street	0.03	75% or Less of AQO	Negligible
R33	Residential - Silvercroft Street	0.07	75% or Less of AQO	Negligible
R34	Educational - Crown Street Phase 2	0.05	75% or Less of AQO	Negligible
R35	Residential - Crown Street Phase 2	0.05	75% or Less of AQO	Negligible
R36	Residential - Crown Street Phase 2	0.08	75% or Less of AQO	Negligible
R37	Residential - Deansgate Square South Tower	0.18	75% or Less of AQO	Negligible
R38	Residential - Castle Wharf	0.08	75% or Less of AQO	Negligible

Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R39	Residential - Castle Wharf	0.07	75% or Less of AQO	Negligible

6.124. As indicated in Table 6.20, the significance of impacts on annual mean PM_{10} concentrations as a result of road vehicle exhaust emissions associated with the Proposed Development was predicted to be **negligible** at all sensitive receptor locations.

6.125. Based in the assessment results the overall impact significance upon annual mean PM_{10} concentrations as a result of the Proposed Development was determined to be **not significant**.

Annual Mean Particulate Matter– $PM_{2.5}$

6.126. Predicted annual mean $PM_{2.5}$ concentrations across sensitive uses within the Site for the 2027 DS scenario are summarised in Table 6.20.

Table 6.20 Predicted Annual Mean $PM_{2.5}$ Concentrations

Floor Level (m)	Predicted Annual Mean $PM_{2.5}$ Concentration Range (µg/m³)	
	Building F1	**Building F2**
Ground Floor Level 00 (1.5)	**9.73 – 10.41**	**9.64 – 10.07**

6.127. As indicated in predicted $PM_{2.5}$ concentrations do not exceed the annual mean AQO across the ground floor level of either Building F1 and Building F2.

6.128. Based on the results of the dispersion modelling assessment, the Site is suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated annual mean $PM_{2.5}$ concentrations.

Predicted Annual Mean concentrations at Sensitive Receptors

6.129. Predicted annual mean $PM_{2.5}$ concentrations for the DM and DS scenarios are summarised in Table 6.21.

Table 6.21 Predicted Annual Mean PM2.5 Concentrations

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration Range (µg/m³)		
		DM	**DS**	**Change**
R1	Residential - Chester Road	9.58	9.59	0.01
R2	Residential - Chester Road	9.59	9.60	0.01
R3	Residential - Chester Road	9.65	9.66	0.01
R4	Residential - Chester Road	11.53	11.56	0.03
R5	Residential - Chester Road	10.50	10.52	0.02

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration Range ($\mu g/m^3$)		
		DM	DS	Change
R6	Residential - Chester Road	10.36	10.37	0.01
R7	Residential - Egerton Street	11.58	11.60	0.02
R8	Residential - Egerton Street	10.40	10.42	0.02
R9	Residential - Egerton Street	10.82	10.84	0.02
R10	Residential - Egerton Street	10.14	10.15	0.01
R11	Residential - Egerton Street	9.63	9.63	0.00
R12	Residential - Mancunian Way	9.71	9.71	0.00
R13	Residential - Chester Road	10.49	10.52	0.03
R14	Residential - City Road East	9.69	9.71	0.02
R15	Residential - City Road East	9.61	9.62	0.01
R16	Residential - City Road East	9.63	9.66	0.03
R17	Residential - Albion Street	9.79	9.80	0.01
R18	Residential - Albion Street	9.65	9.65	0.00
R19	Residential - Old Deansgate	9.63	9.67	0.04
R20	Residential - Bridgewater Viaduct	9.82	9.86	0.04
R21	Residential - Owens Street	9.50	9.55	0.05
R22	Residential - Owens Street	9.53	9.56	0.03
R23	Residential - Whitworth Street East	9.50	9.51	0.01
R24	Commercial - Great Jackson Street	11.31	11.32	0.01
R25	Commercial - Egerton Street	12.76	12.78	0.02
R26	Commercial - Egerton Street	12.02	12.04	0.02
R27	Commercial - Gaddum House	9.70	9.71	0.01
R28	Residential - Silvercroft Street	10.48	10.49	0.01
R29	Residential - Silvercroft Street	9.90	9.91	0.01
R30	Residential - Silvercroft Street	10.35	10.36	0.01

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration Range (µg/m³)		
		DM	DS	Change
R31	Residential - Silvercroft Street	9.91	9.93	0.02
R32	Residential - Silvercroft Street	9.74	9.75	0.01
R33	Residential - Silvercroft Street	10.03	10.05	0.02
R34	Educational - Crown Street Phase 2	11.50	11.51	0.01
R35	Residential - Crown Street Phase 2	11.55	11.57	0.02
R36	Residential - Crown Street Phase 2	12.02	12.03	0.01
R37	Residential - Deansgate Square South Tower	9.79	9.82	0.03
R38	Residential - Castle Wharf	9.59	9.61	0.02
R39	Residential - Castle Wharf	9.62	9.64	0.02

6.130. As indicated in Table 6.22 predicted annual mean $PM_{2.5}$ concentrations do not exceed the relevant AQO at any sensitive receptor locations, in both the DM and DS scenarios.

6.131. The significance of potential impacts is considered further in Table 6.22.

Table 6.22 Predicted Annual Mean PM2.5 Impacts

Sensitive Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R1	Residential - Chester Road	0.04	75% or Less of AQO	Negligible
R2	Residential - Chester Road	0.04	75% or Less of AQO	Negligible
R3	Residential - Chester Road	0.04	75% or Less of AQO	Negligible
R4	Residential - Chester Road	0.12	75% or Less of AQO	Negligible
R5	Residential - Chester Road	0.08	75% or Less of AQO	Negligible
R6	Residential - Chester Road	0.04	75% or Less of AQO	Negligible
R7	Residential - Egerton Street	0.08	75% or Less of AQO	Negligible
R8	Residential - Egerton Street	0.08	75% or Less of AQO	Negligible
R9	Residential - Egerton Street	0.08	75% or Less of AQO	Negligible

Sensitive Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R10	Residential - Egerton Street	0.04	75% or Less of AQO	Negligible
R11	Residential - Egerton Street	0.00	75% or Less of AQO	Negligible
R12	Residential - Mancunian Way	0.00	75% or Less of AQO	Negligible
R13	Residential - Chester Road	0.12	75% or Less of AQO	Negligible
R14	Residential - City Road East	0.08	75% or Less of AQO	Negligible
R15	Residential - City Road East	0.04	75% or Less of AQO	Negligible
R16	Residential - City Road East	0.12	75% or Less of AQO	Negligible
R17	Residential - Albion Street	0.04	75% or Less of AQO	Negligible
R18	Residential - Albion Street	0.00	75% or Less of AQO	Negligible
R19	Residential - Old Deansgate	0.16	75% or Less of AQO	Negligible
R20	Residential - Bridgewater Viaduct	0.16	75% or Less of AQO	Negligible
R21	Residential - Owens Street	0.20	75% or Less of AQO	Negligible
R22	Residential - Owens Street	0.12	75% or Less of AQO	Negligible
R23	Residential - Whitworth Street East	0.04	75% or Less of AQO	Negligible
R24	Commercial - Great Jackson Street	0.04	75% or Less of AQO	Negligible
R25	Commercial - Egerton Street	0.08	75% or Less of AQO	Negligible
R26	Commercial - Egerton Street	0.08	75% or Less of AQO	Negligible
R27	Commercial - Gaddum House	0.04	75% or Less of AQO	Negligible
R28	Residential - Silvercroft Street	0.04	75% or Less of AQO	Negligible
R29	Residential - Silvercroft Street	0.04	75% or Less of AQO	Negligible
R30	Residential - Silvercroft Street	0.04	75% or Less of AQO	Negligible
R31	Residential - Silvercroft Street	0.08	75% or Less of AQO	Negligible
R32	Residential - Silvercroft Street	0.04	75% or Less of AQO	Negligible
R33	Residential - Silvercroft Street	0.08	75% or Less of AQO	Negligible
R34	Educational - Crown Street Phase 2	0.04	75% or Less of AQO	Negligible

Sensitive Receptor		% Change Relative to AQO	Long Term Average	Significance of Impact
R35	Residential - Crown Street Phase 2	0.08	75% or Less of AQO	Negligible
R36	Residential - Crown Street Phase 2	0.04	75% or Less of AQO	Negligible
R37	Residential - Deansgate Square South Tower	0.12	75% or Less of AQO	Negligible
R38	Residential - Castle Wharf	0.08	75% or Less of AQO	Negligible
R39	Residential - Castle Wharf	0.08	75% or Less of AQO	Negligible

6.132. As indicated in Table 6.22 the significance of impacts on annual mean $PM_{2.5}$ concentrations as a result of road vehicle exhaust emissions associated with the Proposed Development was predicted to be **negligible** at all sensitive receptor locations.

6.133. Based in the assessment results the overall impact significance upon annual mean $PM_{2.5}$ concentrations as a result of the Proposed Development was determined to be **not significant.**

Impact Significance

6.134. The overall significance of operational phase road traffic emission impacts was determined as **minor adverse**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in the assessment methodology detailed in Table 6.2. Further justification is provided in Table 6.23.

Table 6.23 Overall Road Traffic Exhaust Emission Impact Significance

Guidance	Comment
Number of properties affected by minor, moderate or major air quality impacts and a judgement on the overall balance	Impacts on annual mean NO_2 concentrations were predicted to be negligible at 36 receptor locations, minor at 1 location, and moderate at 2 receptor locations. Impacts on PM_{10} and $PM_{2.5}$ concentrations were predicted to be negligible on a permanent basis at all sensitive receptors. The receptor locations at which moderate adverse impacts were predicted are isolated within two distinct areas. The first moderately effected receptor location (R4) is situated immediately adjacent to the A56 Chester Road, wth the second (R7) situated adjacent to A57(M) and Deansgate Interchange. These 2 locations represent a small number of properties as well as members of the public and therefore associated impacts are considered minor adverse. Additional modelling at first floor receptors

Guidance	Comment
	adjacent to the A57(M) represented by R8 indicated negligible impacts and suggest the impacts are isolated to ground floor locations. Having reached that conclusion, it should be noted that associated impacts were also based on worst case sensitivity analysis in the form of robust emission factor assumptions. The use of 2027 operational traffic data, together with 2019 emission factors does not consider future improvements, guided by the MCC AQAP, and significantly overestimates future pollutant concentrations within the modelling domain. Therefore, a sufficient level of confidence can be placed within the predicted emission levels and conclusions regarding impact significance.
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	The Proposed Development results in no new exposure to annual mean NO_2 pollutant concentrations above the AQOs. All exceedances of the annual mean are present in the DM scenario and are not a result of the Proposed Development.
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The change in concentrations relative to the annual mean AQO for NO_2 was predicted to range between 0.10% and 1.05%. Resultant impacts were therefore described as either negligible, minor adverse or moderate adverse on in accordance with the EPUK and IAQM criteria. 2 of the 39 receptor locations were predicted to experience moderate adverse NO_2 impacts and therefore the overall balance is considered minor adverse. The change in concentrations relative to the AQO for PM_{10} and $PM_{2.5}$ was predicted to range from <0.01% to 0.20%. Resultant impacts were therefore described as negligible at all sensitive receptors considered.
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 NO_2 at 8 sensitive receptor locations within the modelling extents for the 2027 DM and DS scenarios. Critically, all AQO exceedances were predicted during both the DM and DS and therefore no new exposure above the AQO are accounted to the operation of the Proposed Development. Conversely, there were no predicted exceedances of the annual mean AQO for PM_{10} or $PM_{2.5}$ at any location within the modelling extents.

Guidance	Comment
The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m³ should attract less significance than an annual mean of 51µg/m³	As stated above there were exceedances of the annual mean AQO for NO_2 at 8 sensitive locations, of which two locations exceeded an annual mean concentration of 51µg/m³. The maximum exceedance was predicted at 52.79µg/m³ (R4) and 52.79µg/m³ (R25). It should be noted that of the aforementioned receptor locations only R4 was predicted to experience moderate adverse impacts.

6.135. 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.

Mitigation Measures

6.136. There are a number of air quality mitigation options available to ensure suitable reductions to air quality impacts as a result of the Proposed Development. Additionally, mitigation measures are required to protect existing receptor locations as a result of fugitive dust emissions and road vehicle exhaust emissions generated by the construction and operational phase of the Proposed Development. Measures relevant to the operational and construction of the Site are outlined in the following Sections.

Construction Phase Assessment

6.137. The IAQM guidance provides a number of potential mitigation measures to reduce potential impacts from the construction phase. The Site has been classified as a **high** risk in regard to the potential of dust soiling and **low** risk in regards to human health resulting from construction phase activities. Mitigation measures have therefore been adapted for the Site and summarised in Table 6.24. It will be required to review these measures prior to the commencement of construction works and incorporated into existing strategies.

Table 6.24 Fugitive Dust Mitigation Measures

Guidance	Comment
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

Guidance	Comment
Site Management	Record all dust 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 Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority.
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 dust 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 actives 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

Guidance	Comment
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, conveyors and covered skips Minimise drop heights Ensure equipment is readily available on site to clean any spillages
Waste Management	No bonfires or burning of waste materials
Demolition	Soft strip inside buildings before demolition Ensure effective water suppression is used during demolition operations Bag and remove any biological debris before demolition
Earthworks	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
Construction	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 powder ensure bags are sealed after use and stored appropriately to prevent dust

Guidance	Comment
Trackout	Use water-assisted dust sweeper on the access and local roads
	Avoid dry sweeping of large areas
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials
	Inspect on-site haul routes for integrity, instigate necessary repairs and record in site log book
	Record all inspections of haul route and any subsequent action in a site log book
	Install hard surfaced haul routes which are regularly damped down with fixed or mobile sprinkler systems, or mobile bowsers and regularly cleaned
	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

6.138. Assuming the relevant mitigation measures outlined in Table 6.24 are implemented, the residual effect from all dust generating activities is predicted to be **negligible** and **not significant** in accordance with the IAQM guidance[15]. These will be set out in a detailed Construction Management Plan for approval prior to the development commencing.

Operational Phase Assessment

Abatement Measures

6.139. Detailed dispersion modelling undertaken at heights equivalent to the proposed elevations of Building F1 and Building F2 (indicated that amenity space across ground (1.5m) and residential units on first floor (10.5m) are **not** predicted to be exceed relevant annual mean AQO for NO_2 or PM.

6.140. Subsequently, further measures aimed to reduce annual mean NO_2 across the Proposed Development are **not** required.

Operational Phase Offsetting Measures

6.141. Although associated operational impacts have been deemed of **minor adverse** significance the Proposed Development will implement a comprehensive mitigation strategy to offset additional road vehicle exhaust emissions.

6.142. Given there is still a requirement to secure a reduction in pollution concentrations associated with road vehicle exhaust emissions. The offsetting measures are therefore proposed and will be implemented within the design of the Proposed Development:

[15] Land-Use Planning & Development Control: Planning For Air Quality http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

- 296 parking spaces with up to 20% demand-led Electric Vehicle Charge (EVC) provision (7kw each). Spaces will be future proofed with containment channels that enable cable connections to be installed as and when required.
- 988 Private Cycle Parking Spaces.

6.143. 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.

6.144. Furthermore, the significant offsetting investments will future proof the scheme and reduce associated impacts over time with the increased uptake of low emission vehicles.

Cumulative Effects

6.145. Cumulative effects are defined as those that occur as a result of combined past, 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 2.1.

Construction Phase

6.146. A review of the MCC planning portal indicated there are a number of planning applications within 350m of the Proposed Development, as listed in Appendix 2.1. As such, there is a likelihood for cumulative effects should the construction phases of the committed development's overlap.

6.147. However, the implementation of the mitigation measures suggested in Table 6.24 will ensure that any cumulative effects will ensure that concurrent Construction Phase impacts are **negligible** on a temporary basis and therefore construction phase impacts are considered **not significant**. It is also presumed that adjacent sites will be adhering to Dust Management Plans to control fugitive dust emission from construction activities, on the basis that it is standard practice for planning permissions to be subject to approval of detailed Construction Method Statements and Construction Environmental Managements Plans.

Operational Phase

6.148. The assessment has considered the effect of the Proposed Development in conjunction the identified committed developments with Appendix 2.1. Associated traffic generation from the appropriate and available applications were factored into the modelled traffic data to consider the combined risk of committed developments and the Proposed Development. The future year 2027 DM and DS scenario traffic flows as provided by Curtins, the appointed Transport Consultant for the scheme. This ensures consistency between these two linked topic area assessments.

Residual Effects

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

Construction Phase

6.150. Assuming the relevant mitigation measures outlined are implemented, the residual effect from all dust generation activities is predicted to be **negligible**.

Operational Phase

6.151. Predicted impacts on referenced pollutant species as a result of the operational phase were predicted to be **minor adverse** at 8 sensitive receptor locations.

6.152. When considering the high level of offsetting measure provided, the residual effects resulting from development generated road vehicle exhaust emissions are predicted to be **not significant**.

6.153. Additionally, assuming a suitable uptake of sustainable transport methods supported by government strategies and the MCC AQAP, permanent impacts would therefore be considered as not significant in light of significant offsetting measures proposed within the design of the Proposed Development.

Summary

6.154. The Proposed Development has the potential to cause air quality impacts during both the construction and operational phases.

6.155. During the construction phase of the Proposed Development there is potential for air quality impacts at human receptors as a result of fugitive dust emissions from the Site. These were assessed in accordance with the relevant guidance methodologies. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **negligible** and subsequently **not significant**.

6.156. Dispersion modelling was undertaken in order to quantify pollutant concentrations at the Site and assess potential exposure of future users. Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ were predicted across the ground to first floor levels of Building F1 and F2, and were subsequently verified using local monitoring results obtained from MCC and SCC.

6.157. The dispersion modelling results indicated that annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations across proposed sensitive residential use were below the relevant AQOs. The location is therefore considered suitable for the proposed end-use without the implementation of protective mitigation techniques.

6.158. In addition, dispersion modelling was undertaken in order to predict air quality impacts at sensitive receptor locations within the vicinity of the Site as a result of the additional road vehicle exhaust emission generated by the operation of the Proposed Development. This indicated that the increase in pollutant concentrations at sensitive receptor locations was deemed **minor adverse**.

6.159. As a result, a comprehensive offsetting strategy is to be employed to reduce development generated emissions. The strategy includes provision of up to 20% demand-led Electric Vehicle Charge (EVC) provision (7kw each). Spaces will be future proofed with containment channels that enable cable connections to be installed as and when required. The Site will also provide a dedicated Cycle parking space for each dwelling.

6.160. Therefore, in light of the comprehensive offsetting strategy the overall significance of potential

residual impacts is considered to reduce from minor adverse to **not significant**, in accordance with the relevant guidance criteria.

7. Climate Change

Introduction

7.1. This section reports the impacts of the Proposed Development on the climate by providing an assessment of GHG emissions, that concludes on the significance of the Proposed Development in terms of climate change.

7.2. The section describes the assessment methodology and the baseline conditions relevant to the assessment. It includes a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed.

7.3. This section (and its associated figures) should be read as part of the wider ES.

7.4. This report has been prepared by members of the WSP Sustainability & Climate Change Team who have been responsible for undertaking the assessments reported, contributing to the information described and for compiling the document. Table 7. 1 provides details of the experts who have contributed.

Table 7. 1- Competent Expert Evidence

Name	Competent Expert Evidence
Yanis Savvopoulos (Technical Reviewer)	• Masters in Architecture • MSc Environmental Design & Engineering, Accredited Energy and Carbon Assessor by CIBSE (LCC, LCEA) • MCIBSE, CEng, ARB • 7 years of experience
Danae Petrou (GHG Author)	• Masters in Architecture • MSc Environmental Design & Engineering • ARB, LEED GA, WELL AP • 2 years of experience

Legislative Framework, Policy and Guidance

Legislative Framework

7.5. The applicable legislative framework comprises:

- Climate Change Act 2008 (2050 Target Amendment) Order 2019: introduce a net zero target for at least 100% reduction in GHG emissions (compared to 1990 levels) in the UK by 2050[16];
- Planning and Energy Act 2008[17];
- The Carbon Plan: Delivering our Low Carbon Future, 2011[18];

[16] HM Government, Climate Change Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/27/introduction
[17] HM Government, Planning and Energy Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/21/introduction
[18] 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

- UK Climate Change Risk Assessment, 2017[19];
- Carbon Budgets, 2016[20]; and
- Building Regulations 2010, Approved Document L1A: conservation of fuel and power in new dwellings, 2013 edition with 2016 amendments[21].

Planning Policy

7.6. The following policy documents have been considered in defining the scope and focus of the assessment presented in this report:

- National Planning Policy Framework - NPPF (2021): The NPPF 2021 sets out the Governments 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 eight, 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. "[22]; and
- Great Manchester Combined Authority (GMCA) Climate Emergency Declaration in July 2019, aiming to achieve carbon neutrality by 2038[23].

Guidance

7.7. The following guidance documents have been used during the preparation of this Report:

- Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA)[24];
- RIBA 2030 Climate Challenge (version 2-2021)[25]; and
- National Planning Practice Guidance on Climate Change[26].

Assumptions and Limitations

7.8. The construction phase is assumed to be between 2022 and 2027. The operational phase of the development is assumed to start on 2028. Since the expected lifespan of this development for this assessment has been assumed to be 60 years, then the operational part of the assessment covers the period 2028-2087.

7.9. It should be noted that within the 2028-2087 period, the first two decades up to 2050 the most critical ones regarding their impact on climate. This is because in June 2019 parliament passed

[19] HM Government (2017). UK Climate Change Risk Assessment 2017. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/584281/uk-climate-change-risk-assess-2017.pdf
[20] HM Government, 2016. The Carbon Budgets Order 2016
[21] HM Government, 2016. The Building Regulations 2010, Approved Document L1A: conservation of fuel and power in new dwellings, 2013 edition with 2016 amendments. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/540326/BR_PDF_AD_L1A_2013_with_2016_amendments.pdf
[22] Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf
[23] https://www.greatermanchester-ca.gov.uk/news/combined-authority-declares-climate-emergency/
[24] Institute of Environmental Management and Assessment (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance
[25] Royal Institute of British Architects, 2021. RIBA 2030 Climate Challenge. Available at: https://www.architecture.com/-/media/files/Climate-action/RIBA-2030-Climate-Challenge.pdf
[26] Department for Communities and Local Government. National Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planningpractice-guidance

legislation requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050. Doing so would make the UK a 'net zero' emitter. Prior to this, the UK was committed to reducing net greenhouse gas emissions by at least 80% of their 1990 levels, also by 2050.

7.10. Regarding whole life embodied emissions assessment, a Lifecycle Carbon Assessment has been undertaken for a typical Renaker residential tower, and specifically the C1 tower of Trinity Islands development. C1 tower is a similar to development to the Proposed Development (towers F1, F2) in terms of scale, material quantities and material specifications and therefore it is considered to be an appropriate reference to be used for this assessment. It should be noted that this is a planning stage estimate utilising estimated quantities and generic material data for the proposed development, that would produce a conservative setoff results that would be expected to improve with more detailed information during the later design stages.

7.11. Regarding operational building emissions, the RIBA targets that are used for benchmarking include both regulated and unregulated loads. Regarding the regulated energy consumption, data has been derived from the Energy Statement provided by Element Sustainability. For the assessment of the unregulated energy loads, the findings of the "Embodied and whole life carbon assessment for architects" report by Sturgis S. and RIBA (2019)[27] , according to which unregulated building emissions are 22.5% of the regulated building emissions. This finding is also referenced in the RIBA Sustainable Outcomes Guide 2019[28] . It should be noted that the unregulated carbon emissions can be highly unpredictable, as they depend on the future tenants of the residential units.

7.12. The assessment of the operational building emissions takes into consideration the national grid decarbonisation which will largely take place between today and 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 the years (although the energy consumption will remain the same). To account for this benefit and to present a conservative approach, the electricity emission factor used is the average of the electricity emission factors for the period 2028-2087, based on the emissions factors published by the government[29.]

7.13. Regarding the assessment of the operational transport carbon emissions, the on-demand approach in EV charging infrastructure installation has been assessed as part of the additional mitigation measures. To assess the mitigation effect of this approach, the projections from Transport Assessment Guidance (TAG) Data Book[30] has been used. All EVs assumed to be Battery Electric Vehicles (BEV) for this assessment. The percentage of EV trips is changing every year according to these projections while slowly increasing. Therefore, the EV trips per year are calculated and then the total EV trips in the period 2028-2087 is estimated. An annual average which incorporates this trend is used for the assessment of the annual transport emissions of the development.

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[27] Sturgis S. and RIBA, 2019. Embodied and whole life carbon assessment for architects. Online Available at: https://www.architecture.com/-/media/gathercontent/whole-life-carbon-assessment-for-architects/additional-documents/11241wholelifecarbonguidancev7pdf.pdf

[28] RIBA, 2019. RIBA Sustainable Outcomes Guide. Available at: https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf (Accessed: 05/11/2021)

[29] The Grid Average consumption based carbon intensity figures for Domestic developments were used, as published by the UK government (https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal)

[30] Department of Transport, 2021. Transport Assessment Guidance (TAG) Data Book - July 2021, v.1.15. Table A 1.3.9. – Proportion of vehicle kilometres per fuel type. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1007435/tag-data-book.xlsm (Accessed: 13/09/2021)

7.14. No further analysis has been undertaken as to the long-term increases in vehicle efficiency and possible increase in autonomous vehicle use. These would likely reduce the total GHG emissions associated with the Proposed Development.

Methodology

7.15. This section of the report sets out the scope of the assessment.

7.16. The emissions sources, described as elements with their associated Lifecycle Stage during the Proposed Development's lifespan, have been identified using guidance from IEMA. Professional judgement has been used to determine which sources to scope in and out of further assessment, as outlined in Table 7. 2.

7.17. The scope of the assessment is consistent with the framework for the quantification of GHG emissions presented in British Standard (BS) EN 15978:2011 'Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method'.

Table 7. 2 - Scope of the assessment

Element	Phase	Scoped In	Scoped Out	Justification
Product stage (manufacture and transport of raw materials to suppliers) A1-3	Construction	✓		Raw materials required for the Proposed Development will result in embodied emissions and have the potential to be large.
Transport of materials to site A4	Construction	✓		Construction stage emissions from fuel / energy consumption due to the delivery of material to site have the potential to be large.
Plant and equipment use during construction A5	Construction	✓		Fuel / energy consumption of plant and equipment used during construction would generate GHG emissions.
Disposal of waste A5	Construction	✓		Emissions from the disposal of waste are unlikely to be large, due to a large proportion of construction waste being inert.
Replacement and refurbishment B4-5	Operation	✓		The replacement and refurbishment of the Proposed Development would release a potentially large magnitude of emissions.
Operational Energy Use B6	Operation	✓		In-use electricity emissions will be released on an annual basis due to the building use.
End-user emissions (regional traffic flows) – traffic B9/D	Operation	✓		Changes to regional traffic flows are expected and this has the potential to result in a large change in GHG emissions.
Decommissioning process C1-C4	End of Life	✓		Any emissions arising 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 project.
In-use Emissions B1	Operation		✓	This is not considered to be a large emission source.
Maintenance B2-5	Operation		✓	Maintenance associated with the Proposed Development is not considered to be a large emissions source as only a small amount will be additional to the maintenance that already takes place within the region.
Repair B3-5	Operation		✓	The Proposed Development is designed to be maintained rather than repaired, therefore subsequent repair emissions sources are not considered to be large.

Element	Phase	Scoped In	Scoped Out	Justification
Land use, land use change and forestry B8	Construction		✓	Emissions from the disposal of biomass are not expected to be large.

Study Area

7.18. The GHG emissions assessment has not been restricted by geographical area but has instead included any increase or decrease in emissions as a result of the Proposed Development, wherever that may be.

7.19. This includes:

- **Construction emissions** - from the Application Site footprint, but also related to the transport of materials to and from the Application Site and their manufacture (this may be distant from the Proposed Development location);
- **Operational emissions** - (increase or reduction) which result from the end-use of the Proposed Development and any shifts in transport modes/patterns which may occur. Such emissions include those for traffic using the Proposed Development as well as the surrounding regional road network to gain access; and
- **Decommissioning process** - Any emissions arising 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 project.

Assessment Methodology

7.20. The assessment follows the emerging best practice. Current best practice is reflected in IEMA (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance[31]. This guidance advocates a 'good practice' approach where GHG emissions are always considered and reported but at varying degrees of detail depending on the EIA and the project in question.

7.21. In line with the guidance, this report sets out the methodological approach that has been taken to address 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 strategies for mitigation.

7.22. Existing sources of GHG emissions prior to construction and operation of the Proposed Development (i.e. without development) are identified to assess 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.

7.23. The environmental effects assessed are:

- **Whole Life Embodied emissions**: This includes embodied carbon emissions related to materials and construction process throughout the lifespan of the building, including upfront

[31] IEMA (2017), Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance, Online Available at: https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf

emissions during constructions, construction transport emissions, emissions from replacements/repairs during the operational phase and end-of-life emissions.

- Operational Building emissions (from energy use): This includes emission related to the energy consumption of the building, throughout its operational phase
- Operational Transport emissions: This includes emission related to the transport, throughout its operational phase

7.24. More details on these three assessed effects are provided below, organised per construction, operational and end-of-life phase.

Construction Phase

7.25. The construction phase is assumed to be between 2022 and 2027.

Embodied Carbon Emissions

7.26. An assessment of the whole life embodied emissions has been undertaken. This assessment has been undertaken for a typical Renaker residential tower, and specifically the C1 tower of Trinity Islands development. C1 tower is a similar to development to the Proposed Development (towers F1, F2) in terms of scale, material quantities and material specifications and therefore it is considered to be an appropriate reference to be used for this assessment. It should be noted that this is a planning stage estimate utilising estimated quantities and generic material data for the proposed development, that would produce a conservative setoff results that would be expected to improve with more detailed information during the later design stages.

7.27. 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 life cycle, including A1-3 Product stage, A4-5 Construction process stage, B1-5 Use stage and C1-4 End of life stage.

7.28. The LCA tool 'OneClickLCA' has been used to source carbon databases and perform LCA calculations. The OneClickLCA tool utilised is the 'Carbon assessment, RICS', while the materials were chosen from the associated database.

7.29. 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, 2-Superstructure and were assessed based on material quantities derived from the Revit models of the typical Renaker residential tower. 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.

7.30. The GHG results of the assessment were converted to GHG per GIA (kgCO2e/m2) and then multiplied with the GIA of Plot F to populate the GHG results for the Proposed Development.

7.31. To assess the magnitude of impact for this effect, a comparison has been done with the RIBA targets for whole life embodied carbon (including construction, replacements during operation and end-of-life phase), as described in Table 7. 5.

Transport Emissions

7.32. The carbon emissions (CO2e) associated with transportation used during the construction stage were calculated as part of the whole life embodied carbon emissions described above in paragraphs 7.25 - 7.27.

Operational Phase

7.33. The operational phase of the development is assumed to start on 2028, following the 2022-2027 construction phase.

7.34. The assessment of significance of the effects from operational building and transport emissions is undertaken on an annual basis. Since the expected lifespan of this development for this assessment has been assumed to be 60 years, then the operational part of the assessment covers the period 2028-2050.

Embodied Carbon Emissions

7.35. The same procedure has been followed as described above in paragraphs 7.26 - 7.29. The results refer to the replacement/refurbishment of building parts during use stage. The RICS[32] assumptions on material and building component lifespans have been used for this assessment.

7.36. To assess the magnitude of impact for this effect, a comparison has been done with the RIBA targets for whole life embodied carbon (including construction, operation and end-of-life phase), as described in Table 7. 5.

Building Emissions

7.37. For the regulated carbon emissions from the new buildings during the operational stage, an Energy statement was prepared by Element Sustainability. The embedded mitigation measures included as part of this strategy (fabric specification, building services etc.) are summarised in the mitigation section of this chapter.

7.38. The building energy use has been tested for compliance with both Part L (Conservation of Fuel and Power) of the Building Regulations 2010 (2013 edition with 2016 amendments) and the upcoming Part L 2021 (see Energy Statement). The first methodology uses SAP 2012 emission factors for electricity, while the second one uses the SAP 10.1 factors. In both methodologies, the effect of energy efficiency improvements and the low carbon technologies have been considered.

7.39. For the unregulated carbon emissions, the SAP 10.1 methodology[33] has been followed to calculate the annual energy consumption associated with appliances and cooking.

7.40. The unregulated carbon emissions can be highly unpredictable, as they depend on the future tenants of the residential units. For their assessment the findings of the “Embodied and whole life carbon assessment for architects” report by Sturgis S. and RIBA (2019), unregulated building

[32] RICS 2017, Whole life carbon assessment for the built environment. Online Available at: https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf. Data from Table 9 – Indicative component lifespans have been derived.

[33] https://www.bregroup.com/wp-content/uploads/2019/11/SAP-10.1-08-11-2019_1.pdf

emissions are 22.5% of the regulated building emissions. This finding is also referenced in the RIBA Sustainable Outcomes Guide 2019[34].

7.41. To assess the magnitude of impact for this effect, a comparison has been done with the RIBA targets for operational energy consumption (incl. both regulated and unregulated energy loads), as described in Table 7. 5. Since the target by RIBA is based on energy consumption and not on carbon emissions, for the purpose of this assessment the energy consumption figures deriving from DER results have been calculated to energy figures using SAP 10.1 factors.

7.42. Besides assessing the magnitude of impact of effects, it is also important to contextualise the operational building emissions over the proposed development's lifespan. As per IEMA Guidance on Assessing GHG emissions and evaluating their significance[35], it is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact, against sectoral, local or national carbon budgets. For this purpose, the operational emissions are estimated over the 60-year lifespan of the Proposed Development, starting from the opening year (2028) until 2087. The emissions factor used for this calculation takes into consideration the grid decarbonisation, because the development has followed an all-electric approach, using air-source heat pumps instead of gas boilers. The average electricity emissions factor for the period 2028-2087 has been calculated and used for this assessment, based on the predicted electricity emissions factors published by the Government[36].

Table 7. 3 – Predicted electricity emissions factors over the period 2028-2087

Year	Electricity emissions factor (*kgCO2e/kWh*)	Year	Electricity emissions factor (*kgCO2e/kWh*)	Year	Electricity emissions factor (*kgCO2e/kWh*)
2028	0.071	**2048**	0.008	**2068**	0.007
2029	0.066	**2049**	0.007	**2069**	0.007
2030	0.053	**2050**	0.007	**2070**	0.007
2031	0.042	**2051**	0.007	**2071**	0.007
2032	0.036	**2052**	0.007	**2072**	0.007
2033	0.031	**2053**	0.007	**2073**	0.007
2034	0.028	**2054**	0.007	**2074**	0.007
2035	0.025	**2055**	0.007	**2075**	0.007
2036	0.021	**2056**	0.007	**2076**	0.007
2037	0.019	**2057**	0.007	**2077**	0.007
2038	0.018	**2058**	0.007	**2078**	0.007
2039	0.017	**2059**	0.007	**2079**	0.007
2040	0.016	**2060**	0.007	**2080**	0.007
2041	0.013	**2061**	0.007	**2081**	0.007
2042	0.012	**2062**	0.007	**2082**	0.007
2043	0.012	**2063**	0.007	**2083**	0.007
2044	0.011	**2064**	0.007	**2084**	0.007
2045	0.010	**2065**	0.007	**2085**	0.007
2046	0.009	**2066**	0.007	**2086**	0.007
2047	0.008	**2067**	0.007	**2087**	0.007
	Annual Average Electricity emissions factor 2027-2086 (*kgCO2e/kWh*)				**0.013**

[34] RIBA, 2019. RIBA Sustainable Outcomes Guide. Available at: https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf

[35] https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance

[36] The Grid Average consumption based carbon intensity figures for Domestic developments were used, as published by the UK government (https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal)

7.43. The calculation of the operational building emissions for the proposed development over its lifespan is estimated with the purpose of contextualising and not with the purpose of assessing the magnitude of impact, as this is assessed based on the annual operational energy consumption targets from RIBA.

Transport Emissions

7.44. In order 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 where provided by Curtins, and they align with the Transport Assessment and Framework Travel Plan. The 2021 Defra emissions factor selected for each vehicle type represents the closest match. This is summarised in the table below.

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)	kg CO_2e/km	E	E
Total (T)	kgCO_2e	T = ExA	T = ExA

7.45. The use of electric vehicles has been assessed based on the traffic data on personal vehicles provided by Curtins and with the assumption that 10% of the total parking spaces will provide active EV charging infrastructure. Further details are included in the mitigation section of this chapter.

End of Life Phase

Embodied Carbon Emissions

7.46. The same procedure has been followed as described above in paragraphs 7.25 - 7.27. The results refer to the end of life of materials.

7.47. To assess the magnitude of impact for this effect, a comparison has been done with the RIBA targets for whole life embodied carbon (including construction, operation and end-of-life phase), as described in Table 7. 5.

Significance Criteria

Determining Significance Criteria

Sensitivity of receptor and Nature of impact

7.48. There are currently no agreed thresholds for what level of GHG emissions is considered significant in the context of the EIA Regulations. With regards to assigning significance, the IEMA guidance provides guidance on how to assess GHG emissions in EIA:

"When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however, some projects will replace existing development that have higher GHG profiles. The significance of a project's emissions should therefore

be based on its net impact, which may be positive or negative……

…. Whilst there is no single preferred method to evaluate significance, extensive research is being undertaken to explore significance, thresholds for GHG emission assessments, and science-based targets. "

7.49. Within this context, any development proposal that has greater than negligible magnitude of impact will be considered significant in EIA terms and it will be up to the LPA to consider this significance against wider economic, social and environmental benefits of the proposal.

7.50. Following the rationale of IEMA guidance above, the sensitivity of the receptor (which is the climate) is considered to be high and all effects are considered to be adverse.

Assessing the magnitude of impact

7.51. There are currently no agreed thresholds for what level of GHG emissions is considered significant in the context of the EIA Regulations. With regards to assigning significance, the IEMA guidance provides guidance on how to assess GHG emissions in EIA and on contextualising a project's GHG emissions:

"Under the principle that all GHG emissions might be considered significant, and the ongoing research of how to actually measure significance, it is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact.

Generating a project's carbon contribution, will enable the impact of your project, to be contextualised against sectoral, local or national carbon budgets. This will provide the practitioner and the Local Planning Authority with a sense of scale."

7.52. Therefore, to contextualise and assess the carbon emissions of the Proposed Development, these have been compared to:

- **Royal Institute of British Architects (RIBA) 2030 Climate Challenge** (Table 7. 5) targets – with the purpose to assess the magnitude of impact of the effects. This has been undertaken for the whole life embodied emission and operational emissions from energy.
- **Regional Transport Carbon Emission data** (Table 7. 6) – with the purpose to assess the magnitude of impact of the effects. In the absence of specific targets related to transport carbon emissions from new developments, the transport carbon emissions from the propose development have been compared with the regional transport carbon emissions.

7.53. The following paragraphs describe these three significance criteria for determining the magnitude of impact.

7.54. The RIBA has developed targets[37] for embodied carbon and operational energy 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. The targets (summarised in Table 7. 5) 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.

[37] We have been using the latest version of this targets: RIBA (2021). RIBA 2030 Climate Change Challenge – Version 2. Online Available at: https://www.architecture.com/-/media/files/Climate-action/RIBA-2030-Climate-Challenge.pdf

7.55. It should be noted that the operational energy targets have been additionally converted to operational carbon targets based on the government-published predicted electricity carbon factors for 2021 *(Grid Average-Domestic, as per Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal*[38]), expressed in thousands of tonnes of carbon dioxide equivalents ($ktCO_{2e}$) and kilowatt-hours per square meter (kWh/m^2).

7.56. It is also important to highlight that the RIBA targets that are used for benchmarking include both regulated and unregulated loads. On the other hand, the energy figures from the proposed development include only the regulated energy consumption. Therefore, on the later design stages, the assessment should be revised to include both types of loads to enable a better comparison with the RIBA targets.

Table 7. 5 - RIBA 2025 and 2030 targets - Domestic

RIBA Sustainable Outcome Metrics	Business as Usual	2025 Targets	2030 Targets
Embodied Carbon ($kgCO_{2e}/m^2$) - *Lifecycle stages A-C*	1200	< 800	< 625
Operational Energy ($kWh/m^2/y$)	120	< 60	< 35

7.57. A comparison with the RIBA 2030 target, 2025 target and Business-As-Usual benchmark has been undertaken with the purpose to assess the magnitude of impact of the whole life carbon emissions and the operational emissions from energy, as below:

- **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;
- **Moderate magnitude of impact**: where the Proposed Development meets the "Business as Usual" for embodied carbon and operational energy performance respectively as defined by the RIBA guidance;
- **Minor magnitude of impact:** where the Proposed Development meets the "2025 Targets" for embodied carbon and operational energy performance respectively as defined by the RIBA guidance; and
- **Negligible magnitude of impact**: where the Proposed Development meets the "2030 Targets" for the embodied carbon and operational energy performance respectively defined by the RIBA guidance

7.58. The regional transport GHG emissions for Great Manchester have been quantified, as per national statistics (Table 7. 6)[39]. The operational transport emissions of the proposed development are contextualised by comparing with the regional transport GHG emissions to provide a sense of scale.

Table 7. 6 – Regional GHG Emissions, Manchester, 2016 (MtCO2e)

Manchester, 2016	GHG emissions (kt CO2)

[38] HM Government (2020). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. Supplementary guidance to Treasury's Green Book providing government analysts with rules for valuing energy usage and greenhouse gas emissions. Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal (Accessed: 21/07/2021).

[39] https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016

Industry and Commercial (total)	857
Domestic (total)	645
Transport (total)	**676**
Grand total	2,178

7.59. In absence of relevant guidance and benchmarks and using the author's professional experience, all operational emissions from transport are considered to be of moderate magnitude of impact.

Assessing the significance of effects

7.60. The matrix to assess the significance of effects (which are the embodied, building and transport emissions) based on the sensitivity of receptor (which is high for climate) and the magnitude of impact (as explained above) is shown in Table 7. 7. Effects of Major and Major-Moderate significance are considered 'significant' in EIA terms. Effects of Moderate-Minor and Minor significance are considered 'not-significant' in EIA terms.

Table 7. 7 – Matrix to assess significance of effects, based on sensitivity of receptor and magnitude of impact of each effect

Magnitude of impact	Sensitivity		
	High	Medium	Low
Major	Major	Major - Moderate	Moderate - Minor
Moderate	Major - Moderate	Moderate - Minor	Minor
Minor	Moderate - Minor	Minor	Minor - Negligible
Negligible	Minor	Minor - Negligible	Negligible

Contextualising against regional and national carbon budgets

7.61. Carbon budgets place restrictions on the amount of GHG emissions the UK can emit over a five-year period - expressed in millions of tonnes of carbon dioxide equivalents ($MtCO_{2e}$). The UK is the first country to set legally binding carbon budgets. Every tonne of 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. Then the UK carbon budget is apportioned locally, including Great Manchester.

7.62. A comparison with the UK and Great Manchester Carbon Budgets has been undertaken with the purpose to contextualise the effect of the sum of whole life carbon emissions, the operational emissions from energy and transport emissions throughout consecutive 5-year periods of the development's lifespan until 2037.

Table 7. 8 - National carbon budgets set by the Government (MtCO2e)

Carbon Budget Period	UK Carbon Budget ($MtCO_{2e}$)[40]	Great Manchester Carbon Budget ($MtCO_{2e}$)[41]
Third: 2018-2022	2,544	36
Fourth: 2023-2027	1,950	17
Fifth: 2028-2032	1,725	8
Sixth: 2033-2037	965	4

[40] https://www.gov.uk/guidance/carbon-budgets
[41] https://www.manchesterclimate.com/sites/default/files/Greater%20Manchester%20Carbon%20Budget.pdf

Baseline Conditions

Existing Baseline

7.63. 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.

7.64. The current use of the Application Site as construction site is associated with some traffic flows and therefore carbon emissions, which are assessed as part of the existing baseline. Since the industrial building which is currently on Site is not in use, no operational building emissions from energy consumption are generated.

Table 7. 9 - 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*	408,474	2,554	2,708	8,737	635,063	2,550	318,777
Total vehicle trips	*vehicle trips/yr*	33,399	209	221	714	10,764	43	5,403
Average Trip length	*km/trip*	12.23	12.23	12.23	12.23	59	59	59
Emissions factor description	*kgCO2e/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	*kgCO2e/km*	0.28053	0.0503	0.0948	0.1195	0.2402	0.0502	0.4584
Total kg CO2e /year		**114,589**	**128**	**257**	**1,044**	**152,523**	**128**	**146,111**
							Total t CO2e /year	**415**

Sensitive Receptors

7.65. The sensitive receptor relevant to this assessment is the global climate, which is impacted by the creation and release of GHG emissions.

Future Baseline

7.66. No future baseline scenario has been included in this assessment.

Assessment of Potentially Significant Effects

Construction Phase

Embodied and Transport Carbon Emissions

7.67. Activities during the construction phase would generate GHG emissions, particularly from the manufacture of construction materials, but also from transport to the construction Site and from on-Site works.

7.68. The calculations for the embodied carbon emissions generated during the construction phase of the Proposed Development is provided in Table 7. 10.

Table 7. 10 - Embodied and transport carbon emissions during construction phase for F1 and F2

Type	Carbon emissions (t CO2e)
Emissions related to A1-A3 Product Stage	41,101
Emissions related to A4 Transport to Site	1,374
Emissions related to A5 On-site construction works	5,035
Total	**47,510**

7.69. The total tonnes of embodied carbon estimated to be generated during construction phase by the Proposed Development are **47,510 tCO_2e**.

Operational Phase

Embodied Carbon Emissions

7.70. Activities during the operational phase would generate GHG emissions, particularly from the replacement and/or refurbishment of building elements.

7.71. The calculations for the embodied carbon emissions generated during the operational phase are provided in Table 7. 11.

Table 7. 11 - Calculations for the embodied carbon emissions during operation

Type	Carbon emissions (t CO2e)
Emissions related to B1-5 - Use Stage	23,976

7.72. The total tonnes of embodied carbon estimated to be generated during operational phase by the Proposed Development is **23,976 tCO_2e**

Building Emissions

7.73. The calculations for the building emissions during the operational phase related to the first operational year of the Proposed Development are provided in Table 7. 12 below.

Table 7. 12 - Operational building energy consumption and GHG emissions - annually

Energy	Regulated	Unregulated (*incl. cooking and appliances*)	Total
Energy consumption (MWh/yr)	4,270.6	1,244.4	5,515.1
Energy consumption intensity (kWh/m2/yr)	39.7	11.6	**51.3**
Carbon emissions - A. with SAP 10.1			
Carbon emissions (t CO2/yr)	580.8	169.2	750.0
Carbon emissions intensity -BER (kgCO2/m2/yr)	5.4	1.6	7.0

Carbon emissions - B. with decarbonising grid	Regulated	Unregulated (*incl. cooking and appliances*)	Total
Carbon emissions (t CO2/yr)	56.7	16.5	73.3
Carbon emissions intensity -BER (kgCO2/m2/yr)	0.5	0.2	0.7

7.74. The annual regulated energy consumption rate of the proposed development is **4,270.6 MWh/year** and its annual energy consumption intensity per m^2 is **39.7 kWh/m^2/year**. The annual unregulated energy consumption rate of the proposed development is **1,244.4 MWh/year** and its annual energy consumption intensity per m^2 is **11.6 kWh/m^2/year**. The total tonnes of operational emissions estimated to be generated by the Proposed Development is **750.0 tCO_{2e} per year** when using the SAP 10.1 emissions factor.

7.75. However, since the proposed development has followed an all-electric approach using radiant heaters in the residential units and air source heat pumps in the common/landlord areas, then it is realistic to account for the benefits of decarbonising electricity grid when calculating its emissions over the 60-year period. Therefore, using the projected electricity carbon factors as published by the UK Government, then the annual operational building emissions are reduced to **73.3 t CO_{2e}.**

Transport Emissions

7.76. The calculations for the annual transport emissions during the operational phase are presented from Table 7. 13 to Table 7. 15 below.

Table 7. 13 - Transport emissions for delivery and servicing vehicles during the operational phase

Metric	Unit	LGV	LGV (EV)	OGV
Total distance	*km/year*	5,879,477	23,612	289,131
Total vehicle trips	*vehicle trips/yr*	99,652	400	4,901
Average Trip length	*km/trip*	59	59	59
Emissions factor description	*kgCO2e/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	*kgCO2e/km*	0.24017	0.0502	0.45835
Total kgCO2e /year		**1,412,074**	**1,185**	**132,523**

Table 7. 14 - Transport emissions for car vehicle movements during the operational phase – Traffic data provided by Curtins, with 10% EV charging

Metric	Unit	Car - Petrol	Car (BEV)	Car (PHEV)	Car (Hybrid)	Motorcycle
Total distance	*km/year*	7,197,318	145,880	154,711	499,110	6,906
Total vehicle trips	*vehicle trips/yr*	588,386	11,926	12,648	40,803	651
Average Trip length	*km/trip*	12.23	12.23	12.23	12.23	10.61
Emissions factor description	*kgCO2e/km*	Average car, Petrol, per km	Average car, Battery Electric	Average car, Plug in Hybrid Electric	Average car,	Average motorbike, per km

Metric	Unit	Car - Petrol	Car (BEV)	Car (PHEV)	Car (Hybrid)	Motorcycle
			Vehicle, per km	Vehicle, per km	Hybrid, per km	
Emissions factor value	*kgCO2e/km*	0.2805	0.0503	0.0948	0.1195	0.1136
Total kgCO2e /year		2,019,064	7,339	14,671	59,654	784

Table 7. 15 - 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*	1,200,549	7,796,400	867,014	53,329	315,353	2,708,868
Total vehicle trips	*vehicle trips/yr*	86,170	132,402	114,387	6,946	42,759	1,127,370
Average Trip length	*km/trip*	14	59	8	8	7	2
Emissions factor description	*kgCO2e/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 km	On foot
Emissions factor value	*kgCO2e/km*	0.0281	0.0355	0.1023	0.1488	0.0049	0.0098
Total kgCO2e /year		33,771	276,694	88,670	7,933	1,545	26,547

7.77. The total tonnes of transport emissions estimated to be generated by the Proposed Development during the operational phase is **4,082 t CO_{2e} per year** when assuming a 10% active EV changing infrastructure. This annual emission rate would generate **244,947 t CO_{2e}** throughout the 60-year lifetime of the proposed development.

End of Life Phase

Embodied Carbon

7.78. 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.

7.79. The calculations for the embodied carbon emissions generated during the end of life phase are provided in Table 7. 16.

Table 7. 16 - Embodied carbon emissions during end of life

Type	Carbon emissions (t CO2e)
Emissions related to C1: De-construction, Demolition, C2: Transport, C3: Waste processing, C4: Disposal	3,806

7.80. The total tonnes of embodied carbon estimated to be generated during the end of life of the Proposed Development is **3,806 t CO_{2e}**.

Assessment Summary

7.81. Table 7. 17 summarises the embodied, operational and transport emissions per life stage of the development (construction, operation, end-of-life).

Table 7. 17 - Summary of embodied, operational and transport emissions per life stage

Stages	Category	Value	Units
Construction	**Embodied A1-3** - Product and Materials	41,101	t CO2
	Embodied A4 - Transport-to-site	1,374	t CO2
	Embodied A5 - On-site works	5,035	t CO2
Operation	**Embodied B4 -** Replacements	23,976	t CO2
	Operational Energy B6 - Embedded mitigation	5,515	MWh/year
	Operational Energy B6 - Embedded mitigation with SAP 10.1	750	t CO2/year
	Operational Energy B6 - Embedded mitigation with decarbonising grid	73	t CO2/year
	Operational Transport - Embedded mitigation - No EV	4,082	t CO2/year
End-of-life	**Embodied C1-C4** - End-of-life	3,806	t CO2

7.82. Table 7. 18 summarises the total embodied, operational and transport emissions during the construction phase, operational phase and end-of-life phase taking into consideration the embedded mitigation measures.

Table 7. 18 - Summary of total embodied, operational and transport emissions over 60 years

Category	Value	Units
Whole life Embodied emissions (*A-C*)	75,292	t CO2
Operational Building emissions (*Grid decarbonisation*)	4,396	t CO2
Transport Operational Carbon (*10% EV charging*)	244,947	t CO2
Total	**324,635**	**t CO2**

7.83. The whole embodied (A-C from construction to end-of-life) carbon emissions of the development are **75,292 t CO_{2e}, which corresponds to 700 kgCO_2/m^2**.

7.84. The annual energy consumption rate of the proposed development is estimated to be **51.3 kWh/m^2 per year**. Since the proposed development has followed an all-electric approach using electric radiant heaters in the domestic units and air source heat pumps in the common/landlord areas, then it is realistic to account for the benefits of decarbonising electricity grid when calculating its emissions over its 60-year lifetime. Therefore, using the projected electricity carbon factors as published by the UK Government, then the annual operational building emissions are estimated to be **73.3 t CO_{2e}**, or **4,396 t CO_{2e}** over 60 years.

7.85. The total operational transport emissions throughout the lifetime of the development are estimated to be **244,947 t CO_{2e} (4,082 tCO_{2e}/year)**. The results show that transport carbon emissions are the largest share of the all emission categories for the proposed development.

Assessment of Significance of Effects

7.86. In order to assess the significance of the GHG emissions generated by the Proposed Development in terms of embodied carbon, operational carbon (energy) and transport carbon, the comparisons below have been undertaken.

Whole Life Embodied emissions

7.87. The whole-life embodied carbon emissions of the proposed development (including the construction transport emissions) are estimated to be **700 $kgCO_2/m^2$**. This complies with the RIBA **2025** Climate Challenge target (800 $kgCO_2/m^2$), but it doesn't reach the RIBA **2030** Climate Challenge target (625 $kgCO_2/m^2$). Therefore, the embodied carbon emissions are likely to have an effect of **minor magnitude of impact** on climate and therefore the significance of effect of the embodied carbon emissions will be **moderate-minor (adverse)** prior to the implementation of mitigation measures set out below for the construction, operation and end of life phases.

Operational Building Carbon

7.88. The annual energy consumption of the proposed development is estimated to be **51.3 kWh/m^2 per year**. This complies with the **RIBA 2025** Climate Challenge target (60 kWh/m^2 per year). Therefore, the operational carbon emissions is likely to have an effect of **minor magnitude of impact** on climate and therefore the significance of effect of the operational building emissions will be **moderate-minor (adverse)**, prior to the implementation of mitigation measures set out below.

Operational Transport Emissions

7.89. The operational transport emissions of the proposed development are estimated to be **4,082 tCO_{2e}/year** this result is based on the provision of EV charging infrastructure for 10% of parking spaces). This exceeds the existing baseline of transport carbon emission associated with the current use of the Site as the site is not currently associated with transport emissions. However, when compared to the annual regional transport carbon emission data for Manchester (676 ktCO2e), the annual transport emissions from the proposed development have a share of 0.60%.

7.90. There is no method to assess the significance of transport carbon emissions of the proposed development. Based on the author's professional experience, the operational transport carbon emissions are likely to have an effect of **moderate** magnitude of impact on climate and therefore the significance of effect of the operational transport emissions will therefore be **major-moderate (adverse)**, prior to the implementation of mitigation measures set out below.

7.91. The significance of these three effects (whole life embodied, operational building and operational transport emissions) on the climate is summarised in

7.92.

7.93. Table 7. 19. The effect of the Whole life carbon emissions and Operational Building emissions on the climate is considered to be non-significant, while the effect of the Operational Transport emissions on the climate is considered to be significant, prior to the implementation of mitigation measures set out below.

Table 7. 19 – Summary of significance of effects on the climate (prior to additional mitigation)

Environmental Effect	Sensitivity of Receptor	Nature of Impact	Impact Magnitude	Significance
Whole Life Embodied emissions (incl. construction transport)	High	Adverse	Minor	Moderate-Minor Adverse
Operational Building emissions	High	Adverse	Minor	Moderate-Minor Adverse
Operational Transport emissions	High	Adverse	Moderate	Major - Moderate Adverse

Local Carbon Budget Effect

7.94. In order to contextualise the GHG emissions generated by the Proposed Development during the operation phase and provide a sense of scale, the results on the assessment of potential effects have been compared against the local Carbon Budgets of Manchester, as shown in Table 7. 8.

7.95. The total emissions during each of the Great Manchester Carbon Budget 5-year periods is presented in the Table 7. 20 below and compared in percentage terms to the respective budget.

Table 7. 20 - Proposed Development impacts on the local Carbon Budgets

Carbon Budget Period	Great Manchester (GM) Carbon Budget (Mt CO_{2e})	Carbon emissions from the proposed development (Mt CO_{2e})	% share from GM Carbon budget
Third: 2018-2022	36	0.0014	0.0038%
Fourth: 2023-2027	17	0.0530	0.3118%
Fifth: 2028-2032	8	0.0680	0.8503%
Sixth: 2033-2037	4	0.0211	0.5275%

7.96. The Proposed Development is not expected to influence the achievement of Great Manchester carbon budgets prior to the implementation of mitigation measures set out below for the construction, operation and end of life phases.

UK Carbon Budget Effect

7.97. In order to contextualise the GHG emissions generated by the Proposed Development during the operation phase and provide a sense of scale, the results on the assessment of potential effects have been compared against the UK Carbon Budgets, as shown in Table 7. 8.

7.98. The total emissions during each of the UK Carbon Budget 5-year periods is presented in Table 7. 21 and compared in percentage terms to the respective budget.

Table 7. 21 - Proposed Development impacts on the UK Carbon Budgets

Carbon Budget Period	UK Carbon Budget (Mt CO_{2e})	Carbon emissions from the proposed development (Mt CO_{2e})	% share from UK Carbon budget
Third: 2018-2022	2,544	0.0014	0.00005%
Fourth: 2023-2027	1,950	0.0530	0.00272%
Fifth: 2028-2032	1,725	0.0680	0.00394%
Sixth: 2033-2037	965	0.0211	0.00219%

7.99. The Proposed Development is not expected to influence the achievement of national carbon budgets prior to the implementation of mitigation measures set out below for the construction, operation and end of life phases.

Mitigation Measures

Whole Life Embodied Emissions

7.100. For further reduction of embodied carbon emissions, enhancement measures could be identified through all the life cycle stages of the Proposed Development. However, enhancement measures could be identified throughout all the life cycle stages of the Proposed Development, for further minimisation of the effect.

7.101. As the majority of the emissions are related to the product stage, the raw material supply, transport and manufacturing selection is an important element of mitigation. The effects could be reduced further through a monitoring tool that will enable contractors and managers to reliably and effectively benchmark, monitor, and acquire a better understanding of the expected and released embodied carbon footprint of the Proposed Development.

7.102. 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 (*Draft for consultation, September 2020*), which are presented in Table 7. 22.

Table 7. 22 - Circular Economy principles recommended by GLA in the Circular Economy Statement Guidance (Draft for consultation, September 2020)

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)

7.103. Also the next design stages of Proposed Development can seek to align where possible with the Whole Life Carbon reduction principles as recommended by GLA in the Whole Life Carbon Assessment Guidance (*Draft for consultation, September 2020*), presented in Table 7. 23.

Table 7. 23 - Principles for reducing WLC emissions recommended by GLA in the Whole Life Carbon Assessment Guidance *(Draft for consultation, September 2020)*

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.

WLC reduction principles		Key benefits
3	Material selection	Appropriate material choices is 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.
16	Circular economy	The circular economy principle focusses on a more efficient use of materials which in turn leads to carbon and financial efficiencies.

Construction Transport Emissions

Embedded mitigation

7.104. Embedded mitigation measures around the construction-transport emissions comprise the following:

- An **Outline Construction Logistics Plan** has been prepared detailing the proposed number of vehicles and programme over the illustrative phases of the proposed development;
- 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

7.105. Additional mitigation measures around the construction-transport emissions comprise the following:

- Traffic management measures to restrict construction vehicles in certain locations and routes at certain times of the day;
- Concrete existing on-site to be crushed and re-mixed on-site where possible, to reduce need for transportation; and
- Use of local materials where possible to reduce transport distances and supply chain lengths while providing additional local social and economic benefits.

Operational Building Emissions

Embedded mitigation

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

Additional mitigation

7.107. Proposed additional mitigation measures comprise of the following:

- Robust monitoring of energy consumption (i.e. smart metering);
- Procurement of high standards energy efficient whitegoods (A++ where possible) and;
- Monitoring of In-Use Energy Consumption and comparison against the RIBA 2030 targets during later design stages.

Operational Transport Emissions

Embedded mitigation

7.108. The proposed development is located in Manchester city centre, which is one of the most sustainable locations in the northwest, 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.

7.109. 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.

7.110. Indicatively, some are mentioned here:

- The site benefits from excellent sustainable access opportunities and is well connected by existing walking routes to key trip attractors. Bus and train can also be used to easily access the site;
- 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. The proposals include for the provision of 296 car parking spaces to support the residential development. There will be capacity for 10% of parking bays to feature active electric vehicle (EV) charging

points (subject to resident take-up) to facilitate the increasing, widespread transition to electric car usage and ultimately help to support a growing sustainable community; and

- The proposed development will offer 100% cycle parking provision provided in secure, internal locations across the basement levels within the site to encourage the use of sustainable modes of transport.

Additional mitigation

7.111. Additional mitigation is recommended to mitigate the effect of the operational transport emissions on climate. Further to the initial 10% Electric Vehicle Charge (EVC) provision on the opening year Renaker will provide on-demand EVC provision for up to 20% throughout the lifetime of the development and in alignment with trends in EV use.

7.112. The effect of this measure is shown in the table below. To assess the mitigation effect of this additional mitigation measure, the projections from Transport Assessment Guidance (TAG) Data Book[42] have been used. All EVs assumed to be Battery Electric Vehicles (BEV) for this assessment. The percentage of EV trips is changing every year according to these projections while slowly increasing (and up to 20%). Therefore, the EV trips per year are calculated and then the total EV trips in the 60-year period is estimated. An annual average which incorporates this trend is used for the assessment of the annual transport emissions of the development.

7.113. No further analysis has been undertaken as to the long-term increases in vehicle efficiency and possible increase in autonomous vehicle use. These would likely further reduce the total GHG emissions associated with the Proposed Development.

Table 7.24 -Transport emissions for car vehicle movements during the operational phase after additional mitigation – EV data as per Transport Assessment Guidance (TAG) Data Book, on demand increase up to 20% EV charging

Metric	Unit	Car - Petrol	Car - Diesel	Car (BEV)	Motorcycle	
Total distance	*km/year*	4,069,785	2,377,943	1,549,293	6,906	
Total person trips	*vehicle trips/yr*	332,708	194,398	126,656	651	
Average Trip length	*km/trip*	12.23	12.23	12.23	10.61	
Emissions factor description	*kgCO2e/km*	Average car, Petrol, per km	Average car, Diesel, per km	Average car, Battery Electric Vehicle, per km	Average motorbike, per km	
Emissions factor value	*kgCO2e/km*	0.2805	0.2711	0.0503	0.1136	
Total kgCO2e		**1,141,697**	**644,613**	**77,945**	**784**	
					Total tCO2e – Annual (only personal vehicles)	**1,865**
					Total tCO2e – Annual (including personal vehicles, good vehicles and public/active transport)	**3,846**
					Total tCO2e – 60 year lifetime of the development	**230,759**

7.114. When the on-demand EV charging infrastructure approach on additional mitigation is followed, the proposed development is considered to be following a future-ready approach. This future-ready approach will allow for the Proposed Development to benefit in the future from the

[42] Department of Transport, 2021. Transport Assessment Guidance (TAG) Data Book - July 2021, v.1.15. Table A 1.3.9. – Proportion of vehicle kilometres per fuel type. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1007435/tag-data-book.xlsm (Accessed: 13/09/2021)

increased use of electric vehicles and stay aligned with current best-practice in transport trends. Therefore, the operational transport emissions are expected to gradually reduce in the future. Therefore, when additional mitigation is considered the operational carbon emissions is likely to have a residual effect of **minor** (adverse) magnitude of impact on climate.

Residual Effects

7.115. The effects from whole life embodied emissions (incl. construction transport), operational building and operational transport emissions assessed are likely to have a residual minor magnitude of impact and therefore the residual significance of effects will be Moderate-Minor (adverse). This is considered to be '**not-significant**' in EIA terms. A summary is provided in Table 7.25.

Environmental Effect	Sensitivity of Receptor	Nature of Impact	Impact Magnitude	Significance	Additional Mitigation	Residual Impact Magnitude	Residual Significance
Whole Life Embodied emissions (incl. construction transport)	High	Adverse	Minor	**Moderate-Minor Adverse**	For enhancement only: Whole life carbon and construction reduction measures and further optimisation of the construction transport schedule further explored in later design stages, where possible	Minor	**Moderate-Minor Adverse**
Operational Building emissions	High	Adverse	Minor	**Moderate-Minor Adverse**	For enhancement only: Consideration of smart metering, A+++ whitegoods and appliances	Minor	**Moderate-Minor Adverse**
Operational Transport emissions	High	Adverse	Moderate	**Major - Moderate Adverse**	On demand EV Charging infrastructure up to 20%	Minor	**Moderate - Minor Adverse**

Table 7. 25 – Summary of significance of effects on the climate, before and after mitigation

7.116. The total emissions during each of the Great Manchester and UK Carbon Budgets 5-year periods is presented in the Table 7.6 below and compared in percentage terms to the respective budget, as summarised in the table below.

Table 7.26 - Proposed Development impacts on the local and national Carbon Budgets

Carbon Budget Period	Great Manchester (GM) Carbon Budget (Mt CO_{2e})	Carbon emissions from the proposed development (Mt CO_{2e})	% share from GM Carbon budget	UK Carbon Budget (Mt CO_{2e})	Carbon emissions from the proposed development (Mt CO_{2e})	% share from UK Carbon budget
Third: 2018-2022	36	0.0014	0.0038%	2,544	0.0014	0.00005%
Fourth: 2023-2027	17	0.0530	0.3118%	1,950	0.0530	0.00272%
Fifth: 2028-2032	8	0.0680	0.8503%	1,725	0.0680	0.00394%
Sixth: 2033-2037	4	0.0211	0.5275%	965	0.0211	0.00219%

7.117. Overall, the Proposed Development is not expected to influence the achievement of Great Manchester or UK carbon budgets. The findings of the assessment as presented in tables Table 7.6 above and Table 7.27 below show that the adverse effect of the proposed development on climate is not significant.

Environmental Effect	Sensitivity of Receptor	Nature of Impact	Impact Magnitude	Significance	Additional Mitigation	Residual Impact Magnitude	Residual Significance
Whole Life Embodied emissions (incl. construction transport)	High	Adverse	Minor	Moderate-Minor Adverse	For enhancement only: Whole life carbon and construction reduction measures and further optimisation of the construction transport schedule further explored in later design stages, where possible	Minor	Moderate-Minor Adverse
Operational Building emissions	High	Adverse	Minor	Moderate-Minor Adverse	For enhancement only: Consideration of smart metering, A+++ whitegoods and appliances	Minor	Moderate-Minor Adverse
Operational Transport emissions	High	Adverse	Moderate	Major - Moderate Adverse	On demand EV Charging infrastructure up to 20%	Minor	Moderate - Minor Adverse

Table 7.

8. Daylight, Sunlight and 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. 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 negative effects; and the likely residual effects after these measures have been adopted.

8.2. This Chapter of the ES was written by Michael Beatty BSc (Hons) MRICS. Michael is a chartered surveyor with six years' experience specialising in daylight and sunlight. GIA are the largest specialist daylight and sunlight advisor in the UK, with over 25 years of specialisation and expertise, having advised on some of the largest developments within Greater Manchester.

8.3. This assessment and ES chapter has been produced by GIA and is supported by the following technical results within Appendix 8:

- Appendix 8.1 – Drawings of the Baseline and Proposed Scenario;
- Appendix 8.2 – Daylight and Sunlight Results for Baseline v Proposed; and
- Appendix 8.3 – Overshadowing Results and Drawings.

Legislative and Policy Context

Legislation

8.4. 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.

Local Planning Policy

Manchester Core Strategy (2012 – 2027)

8.5. 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.

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

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

8.7. 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.

National Planning Policy

Revised National Planning Policy Framework (2021)

8.8. The National Planning Policy Framework stipulates that *"…Planning policies and decisions should ensure that developments… create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users."*

8.9. The document also states that *"…planning policies and decisions should always seek to secure a good standard of amenity for existing and future occupants of land and buildings."*

8.10. Paragraph 125 further states:

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

[…]

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

National Planning Practice Guidance (NPPG) 2019

8.11. 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."

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

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

Local Planning Policy

Manchester Core Strategy (2012 – 2027)

8.13. 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.

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

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

8.15. The SPD sets out a series of design principles which should be considered and implemented where necessary, those measures relevant to this assessment are:

- Minimise reliance on energy-using equipment for heating, cooling, lighting and natural ventilation.
- Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in the summer.
- Consider the impacts of overshadowing.

Guidance Documents and Standards

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

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

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

8.17. 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).

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

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

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

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

Assessment Methodology and Significance Criteria

Methodology for Determining Baseline Conditions and Sensitive Receptors

8.20. 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."

8.21. The guidelines may also apply to some commercial buildings including schools, hospitals, hotels and hostels, small workshops and some offices. However, no commercial buildings relevant for assessment are located in close proximity to the Development Site.

8.22. The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the Proposed Development.

8.23. The following properties are defined as receptors and will be considered due to their proximity to the Site, and their use:

- Hill Quays
- Lumiere
- The Danube
- Deansgate Square
- City South
- River Street Tower
- Transition
- The Circle
- The Blade
- Elizabeth Tower C1
- Plot G Great Jackson Street

8.24. These properties are identified in the drawings contained at Appendix 8.1.

8.25. 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.

8.26. The Boatmans does not have any habitable rooms facing the proposed development Site and has therefore not been included in the technical assessment.

8.27. Amenity areas to Deansgate Square and Crown Street Phase 2 have been assessed for overshadowing.

Scenarios Assessed

8.28. The following scenarios have been assessed and are reported within this Chapter of the ES:

- Baseline; and
- Scenario Five - Phases A and B, including basement MSCP (for both towers), highways and public realm, plus committed developments.

8.29. 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.

8.30. There is no guidance on including schemes within a certain proximity from the Site, and professional judgement has been used to determine which schemes should be included.

8.31. The Baseline scenario considers the current baseline condition (as can be seen in July 2021) and surrounding committed developments. This scenario is depicted on drawing nos. 1136/01-03 (Appendix 8.1).

8.32. The Proposed Development Scenario One is illustrated on drawing nos. 1136/04-06 (Appendix 8.1).

8.33. The scheme has been updated since the technical analysis was completed, to reflect a minor increase in height. Given the minor increase, the change is not anticipated to alter the outcome of the assessment, and no further technical analysis of the updated scheme is therefore required.

Methodology for Determining Demolition and Construction Effects

8.34. 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.

8.35. 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

8.36. 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

8.37. 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.

8.38. The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings and thus calculate the sun hours on ground in each scenario.

8.39. 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

8.40. 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".

8.41. 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.

8.42. 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'.

8.43. 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.

8.44. 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

8.45. 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. For clarity, information was available for all surrounding sensitive receptors.

8.46. 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.

8.47. 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.

8.48. BS 8206 Part 2 states (para 5.7) that the:

"uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no-sky line".

8.49. Therefore, it is implied that an NSL of at least 80% would be considered satisfactory.

8.50. 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

8.51. 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.

8.52. 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.

8.53. 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".

8.54. 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%.

8.55. BS 8206 Part 2 (section 5.2) states that:

"Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight as from its excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day."

"Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points."

8.56. 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

8.57. 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.

8.58. 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).

8.59. 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."

8.60. 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, 21 June and

21 December.

Summary of Criteria for Daylight and Sunlight

8.61. 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

8.62. 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."*

8.63. 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."

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

8.65. 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.

8.66. 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

8.67. 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.

8.68. For these reasons, the surrounding receptors may have a lower sensitivity to change in an urban location than those located in sub-urban, less dense areas. Sensitivity classification is assigned on how the proposed receptor is able to accommodate or adapt to the effect of the development. The existing residential receptors surrounding the Site reside in a city centre location where there is an expectation for a higher density of development. The Site is currently cleared, meaning it is underdeveloped and unusually open aspect given the city centre location, particularly as it is in a regeneration area identified for high density development in the SRF. These receptors are therefore deemed to have a medium to low sensitivity.

8.69. The following existing receptors are defined as having a medium sensitivity:

- Hill Quays
- Lumiere
- The Danube
- Deansgate Square
- City South
- River Street Tower

8.70. The following receptors are not yet constructed or completed and, as such, are defined as having a low sensitivity:

- Transition
- The Circle
- The Blade
- Elizabeth Tower C1
- Plot G Great Jackson Street

Significance of Effects

8.71. 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		

8.72. When assigning significance criteria for daylight and sunlight effects, professional judgement has been used. Consideration has been given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, sensitivity of the receptor, 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.

8.73. 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.

Limitations and Assumptions

8.74. 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. For clarity, information was available for all surrounding sensitive receptors.

8.75. In cases where no information is available, a standard 4.2 metre (m) (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL).

8.76. Floor levels have been assumed for adjoining properties assessed, where access has not been obtained. This dictates the level of the working plane which is relevant for the NSL assessments.

Baseline Conditions

Daylight & Sunlight

8.77. The full Baseline Daylight and Sunlight results can be found in Appendix 8.2 and are summarised in Table 8.4 below.

8.78. A total of 10,059 windows facing the Site serving 4,446 rooms within 11 buildings were assessed for VSC and NSL for daylight and 1,527 rooms were assessed for APSH for sunlight within 10 buildings.

8.79. Out of the 10,059 windows assessed for daylight, 5,352 (53%) meet the BRE guidelines for VSC. For NSL, 3,328 (75%) of the 4,446 rooms assessed meet the BRE criteria. For sunlight, 1,331 (87%) of the 1,527 rooms assessed meet the BRE criteria for both Winter and Annual APSH.

8.80. For overshadowing, Crown Street Phase 2 was found to meet the BRE criteria for Sun Hours on Ground, whilst Deansgate Square does not meet the BRE criteria.

8.81. Overall, this baseline scenario is considered a moderate level of compliance due to the city centre context of the Site.

8.82. The Site is underdeveloped in the context of the Great Jackson Street Framework, but also within the wider established residential buildings, and therefore has unusually open aspect given the city centre location and new context, which contributes to higher baseline results to the surrounding receptors.

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

Address	Total No. Windows That Meet VSC Criteria		Total No. of Rooms That Meet NSL Criteria		Total no. of Rooms That Meet APSH Criteria	
	Pass	Total	Pass	Total	Pass	Total
Hill Quays	5	366	68	157	33	87
Lumiere	3	159	31	116	10	52
The Danube	0	27	2	22	3	12
Deansgate Square	2,431	4,986	1,890	2,392	734	880
City South	0	176	33	148	8	15
River Street Tower	167	216	169	180	27	27
Transition	35	834	244	379	143	186
The Circle	380	384	192	192	96	96
The Blade	150	235	141	141	47	47
Elizabeth Tower C1	32	124	47	50	26	27
Plot G	975	2,552	426	669	94	98
	4,178	**10,059**	**3,243**	**4,446**	**1,221**	**1,527**

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

Identification and Evaluation of Significant Effects

Daylight to Surrounding Sensitive Receptors

8.84. The full Proposed Development daylight results can be found within Appendix 8.2 and are summarised in Tables 8.5 and 8.6 below.

8.85. A total of 10,059 windows serving 4,446 rooms were assessed for daylight within 11 buildings considered to be sensitive receptors.

8.86. The breakdown of the baseline results against the Proposed Development for each of the individual buildings forming part of this assessment are discussed in more detail below.

Table 8.5 – Summary of VSC Daylight Results

Address	VSC				
			Below BRE Guidelines		
	Total No. of Windows	No. of Windows That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Hill Quays	366	198	41	25	54
Lumiere	159	71	26	33	29
The Danube	27	13	6	3	5
Deansgate Square	4,986	2,993	335	762	896
City South	176	92	48	8	28
River Street Tower	216	216	0	0	0
Transition	834	536	40	34	224
The Circle	384	384	0	0	0
The Blade	235	235	0	0	0
Elizabeth Tower C1	124	124	0	0	0
Plot G	2,552	735	269	344	1,204
Total	**10,059**	**5,597**	**765**	**1,209**	**2,440**

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	135	0	1	21
Lumiere	116	83	11	8	14
The Danube	22	16	2	0	4
Deansgate Square	2,392	1,761	172	133	326
City South	148	121	15	9	3
River Street Tower	180	180	0	0	0
Transition	379	236	35	52	56
The Circle	192	192	0	0	0
The Blade	141	141	0	0	0
Elizabeth Tower C1	50	50	0	0	0
Plot G	669	459	39	19	152
Total	**4,446**	**3,374**	**274**	**222**	**576**

Understanding the Effects in Context to the Site and Surroundings

8.87. The context of the Site and surrounding area is key to understanding the sensitivity of the surrounding receptors and significance of daylight and sunlight effects.

8.88. 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.

8.89. 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".*

8.90. 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:

"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."

8.91. 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:

"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."

8.92. 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.

8.93. This approach is also acknowledged in the BRE Guide, which states:

"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".

8.94. 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 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

8.95. 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%
MoHo, Castlefield	6.4%
Hill Quays, Great Jackson Street	6.8%
Anvil Street, McIntosh Village	8.0%
Lumiere, Great Jackson Street	9.7%
Princess House, Oxford Road	11.9%
The Hacienda, Whitworth Street West	13.6%
Gallery Gardens, Castlefield	13.9%
Deansgate Quay, Deansgate	15.0%
Britannia Mills, Castlefield	18.0%
12 Thomas Street, Northern Quarter	20.2%
Deansgate Square, Great Jackson Street	25.8%
Plot G, Great Jackson Street	26.0%

8.96. 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.

8.97. 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

8.98. A total of 366 windows serving 157 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.99. For VSC, 246 (67%) of the 366 windows meet the BRE criteria. 41 of the affected windows will experience an alteration between 20-30%, 25 of the affected windows will experience an alteration between 30-40%, and the remaining 54 windows will experience alterations in excess of 40% from the baseline value.

8.100. For NSL, 135 (87%) of the 157 rooms assessed will meet the BRE criteria. None of the affected rooms will experience an alteration between 20-30%, one of the affected rooms will experience an alteration between 30-40%, and the remaining 21 rooms will experience alterations in excess of 40% from the baseline value.

8.101. The property has low retained baseline daylight levels, and less than 2% of windows meet the BRE criteria for VSC daylight in the baseline scenario. This places a high burden on the development 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 6.82%, and the average level with the proposal built out is 6.20%. Furthermore, the largest absolute change in VSC is 2.1%, 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.

8.102. The design of Hill Quays is such that deep, single aspect rooms are located on the boundary facing the development site. Windows are typically located beneath balconies and are recessed into deep reveals.

8.103. 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".*

8.104. 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 development site to maintain the existing levels and leads to a number of rooms not meeting the NSL criteria.

8.105. Overall, considering the city centre location, the minor actual reduction in VSC, the 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 in

significance.

8.106. The effect on daylight is considered non-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 6.82% to 6.20% with the Proposed Development in place, which is a minor reduction;
- The largest absolute change in VSC is 2.1%, which the BRE state would not be noticeable to occupants were the windows receiving the published BRE target of 27% in the baseline scenario; 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

8.107. A total of 159 windows serving 116 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.108. For VSC, 71 (45%) of the 159 windows meet the BRE criteria. 26 of the affected windows will experience an alteration between 20-30%, 33 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.

8.109. For NSL, 83 (72%) of the 116 rooms assessed will meet the BRE criteria. 11 of the affected rooms will experience an alteration between 20-30%, eight 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.

8.110. The property has low retained baseline daylight levels, and less than 2% of windows and 27% of rooms meet the BRE criteria for VSC and NSL daylight respectively. This places a high burden on the development 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 9.78%, and the average level with the proposal built out is 7.13% VSC.

8.111. Furthermore, 42 of the windows which do not meet the VSC daylight criteria, and 19 of the rooms which do not meet the NSL daylight target, are bedrooms, which the BRE consider to have a lesser requirement for daylight than principal, habitable rooms.

8.112. Similarly 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.

8.113. 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 in significance.

8.114. The effect on daylight is considered non-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 9.78% to 7.13% with the Proposed Development in place, which is a minor reduction;
- Several of the windows and rooms which do not meet the BRE target criteria are bedrooms, which are considered to have a lesser requirement for daylight; 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.

The Danube

8.115. A total of 27 windows serving 22 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.116. For VSC, 13 (48%) of the 27 windows meet the BRE criteria. Six of the affected windows will experience an alteration between 20-30%, three of the affected windows will experience an alteration between 30-40%, and the remaining five windows will experience alterations in excess of 40% from the baseline value.

8.117. For NSL, 16 (72%) of the 22 rooms assessed will meet the BRE criteria. Two 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 four rooms will experience alterations in excess of 40% from the Baseline value.

8.118. The property has low retained baseline daylight levels, and none of the windows and 9% of rooms meet the BRE criteria for VSC and NSL daylight respectively. This places a high burden on the development 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 8.46%, and the average level with the proposal built out is 6.78% VSC. Absolute changes are also relatively small, and no window is reduced by greater than 2.4% VSC which, given the dense, urban nature of the site, is considered minor.

8.119. Five of the rooms which do not meet the BRE criteria for NSL have low baseline levels of between 15-20%. The actual reduction in no sky line area to these rooms is small but, given the low baseline levels, the change is proportionally much greater.

8.120. 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 in significance.

8.121. The effect on daylight is considered non-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 8.46% to 6.78% with the Proposed Development in place, which is a minor reduction; and
- The largest absolute change in VSC is 2.4%, which the BRE state would not be noticeable to occupants were the windows receiving the published BRE target of 27% in the baseline scenario.

Deansgate Square

8.122. A total of 4,986 windows serving 2,392 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.123. For VSC, 2,993 (60%) of the 4,986 windows meet the BRE criteria. 335 of the affected windows will experience an alteration between 20-30%, 762 of the affected windows will experience an alteration between 30-40%, and the remaining 896 windows will experience alterations in excess of 40% from the baseline value.

8.124. For NSL, 1,761 (74%) of the 2,392 rooms assessed will meet the BRE criteria. 172 of the affected rooms will experience an alteration between 20-30%, 133 of the affected rooms will experience an alteration between 30-40%, and the remaining 326 rooms will experience alterations in excess of 40% from the baseline value.

8.125. 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 unusually high baseline daylight levels. 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.

8.126. Notwithstanding, Deansgate Square will retain average VSC daylight levels of 21.40% with the Proposed Development in place, which is reduced from 25.89% 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.

8.127. For VSC daylight, 879 windows which do not meet the BRE criteria are bedrooms, which the BRE consider to have a lesser requirement for daylight than principal, habitable rooms. The buildings are designed to limit single aspect habitable rooms, and most apartments overlooking the development site are provided with dual aspect accommodation. As such, although windows which face towards the development 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.

8.128. For NSL daylight, 560 rooms which do not meet the BRE criteria are bedrooms, which the BRE considered to have a lesser requirement for daylight. As such, 71 living kitchen diners do not meet the NSL daylight criteria, which represents less than 3% of rooms assessed to this receptor. This is a small proportion relative to the receptor as a whole, and therefore considered minor.

8.129. 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 in significance.

8.130. The effect on daylight is considered non-significant in EIA terms for the following reasons:

- The property has unusually high 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 21.40%, 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

8.131. A total of 176 windows serving 148 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.132. For VSC, 92 (52%) of the 176 windows meet the BRE criteria. 48 of the affected windows will experience an alteration between 20-30%, eight of the affected windows will experience an alteration between 30-40%, and the remaining 28 windows will experience alterations in excess of 40% from the baseline value.

8.133. For NSL, 121 (82%) of the 148 rooms assessed will meet the BRE criteria. 15 of the affected rooms will experience an alteration between 20-30%, nine 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.

8.134. The property has low retained baseline daylight levels, and none of the windows and 22% of rooms meet the BRE criteria for VSC and NSL daylight respectively. This places a high burden on the development 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 12.03%, and the average level with the proposal built out is 9.78% VSC. Absolute changes are also relatively small, and no window is reduced by greater than 4.5% VSC which, given the dense, urban nature of the site, is considered minor.

8.135. 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.

8.136. 54 of the windows that do not meet the VSC daylight criteria, and 15 rooms which do not meet the NSL daylight criteria, are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.

8.137. 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 in significance.

8.138. The effect on daylight is considered non-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 12.03% to 9.78% with the Proposed Development in place, which is a minor reduction;
- The largest absolute change in VSC is 4.5%, 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 Development 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.

River Street Tower

8.139. A total of 216 windows serving 180 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.140. For VSC, 216 (100%) of the 216 windows meet the BRE criteria. For NSL, 180 (100%) of the 180 rooms assessed will meet the BRE criteria.

8.141. The effect on daylight to this property is therefore considered negligible in significance and non-significant in EIA terms.

Transition

8.142. A total of 834 windows serving 379 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.143. For VSC, 536 (64%) of the 834 windows meet the BRE criteria. 40 of the affected windows will experience an alteration between 20-30%, 34 of the affected windows will experience an alteration between 30-40%, and the remaining 224 windows will experience alterations in excess of 40% from the baseline value.

8.144. For NSL, 236 (62%) of the 379 rooms assessed will meet the BRE criteria. 35 of the affected rooms will experience an alteration between 20-30%, 52 of the affected rooms will experience an alteration between 30-40%, and the remaining 56 rooms will experience alterations in excess of 40% from the baseline value.

8.145. This property is not currently built although it received planning permission in May 2019 (LPA ref. 116850/FO/2017). 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 due to be redeveloped. 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.

8.146. Notwithstandingt the above, the average baseline VSC level is 16.03%, and the average level with the proposal built out is 12.18% VSC. 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.

8.147. 118 of the windows that do not meet the VSC daylight criteria, and 74 rooms which do not meet the NSL daylight criteria, are bedrooms, which are considered by the BRE to have a lesser requirement for daylight. As such, 21% of living kitchen diners do not meet the BRE criteria for VSC daylight, and 18% do not for NSL daylight, which is a relatively small proportion of the entire

property.

8.148. 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** in significance.

8.149. The effect on daylight is considered non-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
- Several of the affected windows and rooms are bedrooms which are considered by the BRE to have a lesser requirement for daylight.

The Circle

8.150. A total of 384 windows serving 192 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.151. For VSC, 384 (100%) of the 384 windows meet the BRE criteria. For NSL, 192 (100%) of the 192 rooms assessed will meet the BRE criteria.

8.152. The effect on daylight to this property is therefore considered **negligible** in significance and non-significant in EIA terms.

The Blade

8.153. A total of 235 windows serving 141 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.154. For VSC, 235 (100%) of the 235 windows meet the BRE criteria. For NSL, 141 (100%) of the 141 rooms assessed will meet the BRE criteria.

8.155. The effect on daylight to this property is therefore considered **negligible** in significance and non-significant in EIA terms.

Elizabeth Tower C1

8.156. A total of 124 windows serving 50 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.157. For VSC, 124 (100%) of the 124 windows meet the BRE criteria. For NSL, 50 (100%) of the 50 rooms assessed will meet the BRE criteria.

8.158. The effect on daylight to this property is therefore considered **negligible** in significance and non-significant in EIA terms.

Plot G

8.159. A total of 2,552 windows serving 669 rooms were assessed for daylight within this building to compare the baseline against the Proposed Development.

8.160. For VSC, 735 (29%) of the 2,552 windows meet the BRE criteria. 269 of the affected windows will experience an alteration between 20-30%, 344 of the affected windows will experience an alteration between 30-40%, and the remaining 1,204 windows will experience alterations in excess of 40% from the baseline value.

8.161. For NSL, 459 (69%) of the 669 rooms assessed will meet the BRE criteria. 39 of the affected rooms will experience an alteration between 20-30%, 19 of the affected rooms will experience an alteration between 30-40%, and the remaining 152 rooms will experience alterations in excess of 40% from the baseline value.

8.162. This property is not currently built although it was recently approved (LPA ref. 129273/FO/2021). 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 due to be redeveloped. 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.

8.163. Furthermore, the Site is underdeveloped in the baseline scenario, meaning the proposed apartments overlooking the Site benefit from unusually high baseline daylight levels. 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.

8.164. Notwithstanding, Plot G will retain average VSC daylight levels of 17.70% 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 its surroundings.

8.165. 604 of the windows that do not meet the VSC daylight criteria, and 135 rooms which do not meet the NSL daylight criteria, are bedrooms, which are considered by the BRE to have a lesser requirement for daylight.

8.166. 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 in significance.

8.167. The effect on daylight is considered non-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;
- The property will retain average VSC daylight levels of 17.70%, which is commensurate with other successful residential locations in the city centre; 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.

Sunlight to Surrounding Sensitive Receptors

8.168. The Full Proposed Development Sunlight results can be found within Appendix 8.2 and are summarised in Tables 8.8 and 8.9 below.

8.169. A total of 1,527 living rooms were assessed for sunlight within 11 buildings considered sensitive receptors.

8.170. Windows that are not within 90 degrees of due south, or do not serve living rooms, were excluded from the assessment.

8.171. The buildings are discussed in more detail below.

Table 8.8 – Summary of Annual Sunlight Results

Address	APSH				
			Below threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Hill Quays	87	82	0	0	1
Lumiere	52	43	1	3	5
The Danube	12	5	2	4	1
Deansgate Square	880	737	5	28	83
City South	15	15	0	0	0
River Street Tower	27	27	0	0	0
Transition	186	178	4	4	0
The Circle	96	96	0	0	0
The Blade	47	47	0	0	0
Elizabeth Tower C1	27	27	0	0	0
Plot G	98	98	0	0	0
Total	**1,527**	**1,355**	**12**	**39**	**90**

Table 8.9 – Summary of Winter Sunlight Results

Address	Winter PSH				
			Below threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
Hill Quays	87	82	0	1	4
Lumiere	52	43	0	0	4
The Danube	12	5	2	0	1
Deansgate Square	880	737	0	0	120
City South	15	15	0	0	0

Address	Winter PSH				
			Below threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
River Street Tower	27	27	0	0	0
Transition	186	178	2	0	1
The Circle	96	96	0	0	0
The Blade	47	47	0	0	0
Elizabeth Tower C1	27	27	0	0	0
Plot G	98	98	0	0	0
Total	**1,429**	**1,288**	**4**	**1**	**130**

Hill Quays

8.172. A total of 87 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.173. 82 (94%) of the 87 rooms meet the BRE criteria for both annual and winter PSH. For annual PSH, one affected room will experience an alteration in excess of 40% from the baseline value.

8.174. For winter PSH, one of the affected rooms will experience an alteration between 20-30% and four affected rooms will experience an alteration in excess of 40% from the baseline value.

8.175. Of those rooms which do not meet the BRE criteria, all but one will receive in excess of 29% annual PSH, which is considered minor in context to the site. One room will receive 4% winter PSH, against a target of 5%, which is considered a minor effect in context to the site. Furthermore, only one room assessed will not meet either the annual or winter PSH targets.

8.176. 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 sunlight to this property is considered to be minor adverse in significance.

8.177. The effect on sunlight is considered non-significant in EIA terms for the following reasons:

- The building is designed with deep, single aspect rooms served by recessed windows located beneath balconies; and
- Only one room does not meet either the annual or winter PSH targets, and the impacts on sunlight are considered minor given the urban context of the site.

Lumiere

8.178. A total of 52 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.179. 43 (83%) of the 52 rooms meet the BRE criteria. For annual PSH, one 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 five rooms will experience alterations in excess of 40% from the baseline value.

8.180. For winter PSH, four rooms will experience an alteration in excess of 40% from the baseline value.

8.181. All but four rooms will continue to receive winter PSH in accordance with the BRE criteria with the Proposed Development in place. Baseline APSH levels are generally low, and only 19% of rooms assessed meet the APSH criteria. As such, relatively small changes in sunlight levels represent large proportional changes which would unlikely be noticed by occupants if the baseline levels met the published BRE targets.

8.182. 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 sunlight to this property is considered to be minor adverse in significance.

8.183. The effect on sunlight is considered non-significant in EIA terms for the following reasons:

- The building is designed with deep, single aspect rooms served by recessed windows located beneath balconies;
- Baseline sunlight levels are low, which means small changes in sunlight levels represent large proportional changes; and
- The impacts on sunlight are considered minor given the urban context of the site.

The Danube

8.184. A total of 12 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.185. 5 (42%) of the 12 rooms meet the BRE criteria. For annual PSH, two of the affected rooms will experience an alteration between 20-30%, four affected rooms will experience a reduction between 30-40%, and the remaining one room will experience alterations in excess of 40% from the baseline value.

8.186. For winter PSH, two of the affected rooms will experience an alteration between 20-30% and one room will experience an alteration in excess of 40% from the baseline value.

8.187. Baseline APSH levels to this receptor are low, and only 25% of rooms meet the BRE criteria, which places a burden on the development 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, all but two of the affected rooms are reduced by between 20-30%, which is considered minor given the urban nature of the site.

8.188. 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 sunlight to this property is considered to be moderate adverse in significance.

8.189. The effect on sunlight is considered non-significant in EIA terms for the following reasons:

- The building is designed with deep, single aspect rooms served by recessed windows located beneath balconies;
- Baseline sunlight levels are low, which means small changes in sunlight levels represent large proportional changes; and

- All but two rooms are reduced by between 20-30%, which is considered minor given the urban context of the site.

Deansgate Square

8.190. A total of 880 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.191. 737 (84%) of the 880 rooms meet the BRE criteria. For annual PSH, five of the affected rooms will experience an alteration between 20-30%, 28 of the affected rooms will experience an alteration between 30-40%, and the remaining 83 rooms will experience alterations in excess of 40% from the baseline value.

8.192. For winter PSH, 120 rooms will experience an alteration in excess of 40% from the baseline value.

8.193. Given the context of the area, this receptor will continue to receive good levels of sunlight once the Proposed Development is in place. Whilst there are some deviations from the BRE criteria, these are limited in context to the receptor, and therefore considered minor.

8.194. 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 sunlight to this property is considered to be minor adverse in significance.

8.195. The effect on sunlight is considered non-significant in EIA terms for the following reasons:

- The property has unusually high baseline sunlight 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; and
- In context to the receptor as a whole, a small proportion of rooms do not meet the BRE target criteria.

City South

8.196. A total of 15 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.197. 15 (100%) of the 15 rooms meet the BRE criteria for annual and winter PSH.

8.198. The effect on daylight to this receptor is therefore considered to be negligible in significance and non-significant in EIA terms.

River Street Tower

8.199. A total of 27 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.200. 27 (100%) of the 27 rooms meet the BRE criteria for annual and winter PSH.

8.201. The effect on daylight to this receptor is therefore considered to be negligible in significance and non-significant in EIA terms.

Transition

8.202. A total of 186 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.203. 178 (96%) of the 186 rooms meet the BRE criteria for both annual and winter PSH. For annual PSH, four affected rooms will experience an alteration between 20-30% and four rooms will experience an alteration between 30-40% from the baseline value.

8.204. For winter PSH, two affected rooms will experience an alteration between 20-30% and the remaining one room will experience an alteration in excess of 40% from the baseline value.

8.205. Given the context of the area, this receptor will receive good levels of sunlight once the Proposed Development is in place. It should be noted that, as it is not yet built, 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 due to be redeveloped.

8.206. Whilst there are some deviations from the BRE criteria, these are limited in context to the receptor, and therefore considered minor.

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 sunlight to this property is considered to be minor adverse in significance.

8.208. The effect on sunlight is considered non-significant in EIA terms for the following reasons:

- The property is not yet constructed and it therefore has a lower sensitivity to changes in sunlight;
- Future occupants will not be aware of any reductions in sunlight and will anticipate lower daylight levels due to the proposals set out in the SRF; and
- In context to the receptor as a whole, a small proportion of rooms do not meet the BRE target criteria.

The Circle

8.209. A total of 96 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.210. 96 (100%) of the 96 rooms meet the BRE criteria for annual and winter PSH.

8.211. The effect on daylight to this receptor is therefore considered to be negligible in significance and non-significant in EIA terms.

The Blade

8.212. A total of 47 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.213. 47 (100%) of the 47 rooms meet the BRE criteria for annual and winter PSH.

8.214. The effect on daylight to this receptor is therefore considered to be **negligible** in significance and non-significant in EIA terms.

Elizabeth Tower C1

8.215. A total of 27 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.216. 27 (100%) of the 27 rooms meet the BRE criteria for annual and winter PSH.

8.217. The effect on daylight to this receptor is therefore considered to be **negligible** in significance and non-significant in EIA terms.

Plot G

8.218. A total of 98 rooms within this building were assessed for sunlight to compare the baseline against the Proposed Development.

8.219. 98 (100%) of the 98 rooms meet the BRE criteria for annual and winter PSH.

8.220. The effect on daylight to this receptor is therefore considered to be **negligible** in significance and non-significant in EIA terms.

Overshadowing to Surrounding Sensitive Receptors

8.221. Full results and drawings for the overshadowing analysis are included at Appendix 8.3, and the assessment is discussed in more detail below.

Deansgate Square

8.222. Deansgate Square was assessed for overshadowing. The baseline levels for the amenity areas to Deansgate Square are low, and receive 16%, 3% and 14% SHOG on 21 March without the Proposed Development in place.

8.223. Given the low baseline levels, the reductions brought about by the Proposed Development are proportionally much greater than were the amenity areas to meet the published BRE targets in the baseline scenario.

8.224. As such, the effect on overshadowing to this amenity area is considered to be **minor adverse** in significance and non-significant in EIA terms.

Crown Street Phase 2

8.225. Crown Street Phase 2 was assessed for overshadowing. The amenity areas to this receptor will receive sunlight to 99% and 78% of their area in the baseline scenario. With the proposed development in place, the amenity areas will continue to receive sunlight to 99% and 78% of their area. As such the sunlight amenity is not impacted by the Proposed Development.

8.226. The amenity areas will continue to receive two hours of direct sunlight on 21 March to in excess of 50% its area with the Proposed Development in place. Therefore, it will meet the BRE criteria for Sun Hours on Ground.

8.227. As such, the effect on overshadowing to this amenity area is considered to be **negligible** in significance and non-significant in EIA terms.

Mitigation Measures

Demolition and Construction

8.228. The potential daylight and sunlight effects during demolition and construction have been scoped out, as per paragraph 8.30 and 8.31.

8.229. 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

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

Cumulative Effects

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

Residual Effects

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

Likely Significant Effect	Receptor	Mitigation	Residual Effect
Construction Phase			
Daylight	Scoped Out	-	-
Sunlight	Scoped Out	-	-
Operational Phase			
Daylight	Surrounding Residential Properties	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Sunlight	Surrounding Residential Properties	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Overshadowing	Surrounding Amenity Areas	None Required	Permanent Negligible to Minor Permanent Adverse (Non-Significant Effect)

Summary

8.232. An assessment has been undertaken to establish the likely significant effects of the proposed

development upon the amount of daylight and sunlight received by properties adjacent to the Site.

8.233. To assess the surrounding existing properties, the BRE Guidelines provide two main methods for assessing daylight: VSC and NSL. The VSC method measures the amount of light available on a vertical wall or window following the introduction of barriers such as buildings. The NSL method is a measure of the distribution of daylight at the 'working plane' within a room (i.e. a horizontal 'desktop' plane of 0.85m in height). The NSL divides those areas of working plane in a room which receive direct sky light through the windows from those areas of the working plane which cannot. Where all of the windows meet the VSC and all of the rooms meet the NSL criteria within a property the effect is considered to be negligible.

8.234. For the assessment of sunlight, the approach considers the APSH for a reference point on a window (i.e. if a window point can receive at least 25% APSH, then the room should still receive enough sunlight). Windows are checked to see if they are facing 90° due south, with the emphasis on main living rooms and other rooms such as the kitchen and bedrooms being less important.

8.235. The method for assessing overshadowing is the 'sun-on-ground indicator' (SHOG). The BRE Guidelines recommend that at least half (50%) 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). The methodology for this assessment is set out in detail in paragraphs 8.36-8.76.

8.236. 11 receptors within the surrounding area were identified as having the potential to be impacted on by the proposed development. A total of 10,059 windows serving 4,446 rooms have been assessed for daylight and 1,527 rooms have been assessed for sunlight. Two amenity areas have been assessed for overshadowing.

8.237. In the Baseline Scenario, out of the 10,059 windows assessed for daylight, 4,178 (42%) meet the BRE guidelines for VSC daylight. 3,243 (86%) of the 4,446 rooms assessed meet the BRE criteria for NSL daylight. For sunlight, 1,221 (80%) out of the 1,527 rooms assessed meet the BRE criteria for both Winter and Annual APSH. Two amenity areas were assessed for overshadowing using the SHOG method, one of which meets the BRE criteria in the Baseline Scenario.

8.238. In the Proposed Scenario, with regard to daylight, out of the 10,059 windows assessed for daylight, 5,645 (56%) meet the BRE guidelines for VSC. 3,374 (76%) of the 4,446 rooms assessed meet the BRE criteria for NSL. The effects identified are negligible to moderate adverse in nature and are therefore considered to be not significant. Given the context of the Site, no further mitigation is considered necessary.

8.239. For sunlight, 1,355 (89%) of the 1,527 rooms assessed meet the BRE criteria for both Winter and Annual PSH. The effects identified are negligible to moderate adverse in nature and are therefore considered to be not significant. Given the context of the Site, no further mitigation is considered necessary.

8.240. For overshadowing, Crown Street Phase 2 will continue to receive in sunlight to in excess of 50% of its area on 21 March with the Proposed Development in place. Deansgate Square will not receive sunlight in accordance with the BRE criteria neither prior to the development taking place (baseline), nor in the proposed development scenario. The effects identified are negligible

to minor adverse in nature and are therefore considered to be not significant. Given the context of the Site, no further mitigation is considered necessary.

9. Noise and Vibration

Introduction

9.1. This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to noise and vibration. 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 negative effects; and the likely residual effects after these measures have been adopted.

9.2. This Chapter has been compiled by Fisher Acoustics Ltd. Fisher Acoustics 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 30 years post-graduate experience in acoustic consultancy.

9.3. Appendices to this Chapter are as follows:

- Appendix 9.1: Environmental Noise Study, report reference PR0660-REP01-MPF

Legislative and Policy Context

Legislation

9.4. 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.

9.5. 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).

9.6. 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.

9.7. 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

9.8. 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'.

9.9. 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.

9.10. Paragraph 185 of the National Planning Policy Framework states that: 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.

9.11. 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 Roof 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

9.12. '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.

9.13. The document identifies the subjective grading of noise and the recommended actions and different effect levels, as reproduced in Table 9.1.

Table 9.1: 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 other physiological response. Can slightly affect the acoustic character of	No Observed Adverse Effect	No specific measures required

Perception	Examples of Outcomes	Increasing Effect Level	Action
	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 Local Development Framework – Core Strategy Development Plan 2012-2027

9.14. 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.

9.15. 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.'

'Planning & Noise, Technical Guidance' issued by Manchester City Council, December 2015

9.16. 'Planning & Noise, Technical Guidance', dated December 2015 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.

9.17. 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)
- WHO (1999) Guidelines for Community Noise

Manchester Residential Quality Guidance (Issue 1, March 2017)

9.18. 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'.

Manchester City Council – Noise from construction and demolition sites

9.19. Manchester City Council provides outline information on the control of noise pollution from construction sites in an undated guidance document entitled 'Guidance on completing an application for prior consent; Noise from construction and demolition sites'.

9.20. The document sets out the steps that should be taken when completing a Section 61 application. Where a Section 61 application is not to be made, the document provides a useful reference

document, as it highlights the construction noise assessment method that Manchester City Council are likely to employ when assessing planning applications.

9.21. The document states that:

'The assessment should be completed as per British Standard 5228 (Parts 1 & 2) and usually takes the form of the ABC Method. To assess the impact of noisy work, baseline levels of ambient noise and vibration on the site boundary should be established. These data / details may be available from work carried out for the planning application stage of the development. The measured noise and vibration data should include results for periods during which the works will be carried out. Predictions of construction noise should be calculated at one metre, free field, from the facades of the worst affected (generally the nearest) sensitive receptors, thus allowing for a 'worst case scenario' noise assessment to be made'.

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. Volume 11, Part 7 of the Design Manual for Roads and Bridges (DMRB) 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.

Acoustics, Ventilation and Overheating, Residential Design Guide

9.29. 'Acoustics, Ventilation and Overheating, Residential Design Guide', (AVO) was published by the Association of Noise Consultants and the Institute of Acoustics in January 2020. In the current absence of mandatory requirements under the Building Regulations in relation to the overheating of dwellings, the AVO is 'intended to be used by acoustics practitioners as well as all those involved in the planning, development, design and commissioning of new dwellings. It recommends an approach to acoustic assessments for new residential development that takes due regard of the interdependence of provisions for acoustics, ventilation, and overheating'.

9.30. The AVO presents a method for assessing the risk of an adverse effect on occupants depending on the potential internal noise level within apartments with windows open to control overheating and the duration of window opening.

Assessment Methodology and Significance Criteria

9.31. 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;
- Reference to results of previous noise surveys carried out around the Site that quantify the environmental noise levels at selected existing noise sensitive locations, such as residential properties, and at the location of the Proposed Development;
- 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 nose egress from amenity areas 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; and
- Where appropriate, formulation of proposals for controlling noise and vibration during the construction works, to be agreed with Manchester City Council Environmental Health department.

9.32. 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.

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

a. Dwellings at Owen Street ('Deansgate Square')

b. Dwellings on River Place ('The Boatmans')

c. Dwellings on River Place ('River City')

d. Planning-approved dwellings at Plot G, Great Jackson Street

e. Planning-approved dwellings at Plot E, Great Jackson Street

f. Dwellings on City Road East ('City South')

9.34. Whilst there are other receptors around the Site, these other receptors are at greater distances from the Site than the receptors identified above and with similar exposure to the existing noise sources in the areas. 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.

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

9.36. 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

9.37. 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.

9.38. 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

9.39. 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.

9.40. 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.

9.41. 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.

9.42. Table 9.2 gives the threshold values and explains how the method is applied.

Table 9.2: 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

9.43. 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.

9.44. 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

9.45. 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'.

9.46. 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'.

9.47. 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 9.3: 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

9.48. 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 10.4: Guidance on Effects of Vibration Levels

Vibration Level (PPV)	Effect	Impact Magnitude
0.14 $mm \cdot s^{-1}$	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 $mm \cdot s^{-1}$	Vibration might be just perceptible in residential environments.	Minor
1.0 $mm \cdot s^{-1}$	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 $mm \cdot s^{-1}$	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major

9.49. 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.

9.50. 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 9.5: Vibration Dose Value ranges which might result in various probabilities of adverse comment within residential buildings

Place and Time	Low probability of adverse comment ms-1.75	Adverse comment possible ms-1.75	Adverse comment probable 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

9.51. 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.

Vibration Effects on Buildings

9.52. 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 9.6 Transient vibration guide values for cosmetic damage

Line (see Figure 10.2)	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

9.53. 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'.

9.54. 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.

9.55. 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.

9.56. 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 9.7: 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

9.57. 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.

9.58. 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.

9.59. In such instances, reference can be made to BS 8233: 2014+A1:2019 in order to determine appropriate external noise levels due to buildings services plant, such that acceptable noise levels are achieved inside buildings.

9.60. 'Planning & Noise, Technical Guidance' issued by Manchester City Council in December 2015 gives guidance on the preferred approach to environmental noise assessments. With regard to external noise due to building services plant, Section 3.6.1.5.1 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

9.61. Noise egress from the proposed amenity space 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 10dB 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

9.62. 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.

9.63. 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 9.8: 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**

9.64. 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'.

9.65. 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).

9.66. 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 LAmax,f depending on the character and number of events per night. Sporadic noise events could require separate values'.

9.67. 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 LAmax more than ten to fifteen times per night'.

9.68. With regard to noise ingress to residential dwellings, section 3.5 '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 'Manchester City Council has adopted the following internal 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 LAmax

  (fifteen excesses over 45dB LAmax allowed per night)

Sensitivity of receptors

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

Table 9.9: 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

9.70. 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 9.10: Impact Significance Matrix

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

9.71. 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.

Limitations and Assumptions

9.72. 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 site over the construction programme.

9.73. 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.

Baseline Conditions

Noise

9.74. Ordinarily, a baseline noise survey would be carried out over daytime and night time periods to determine the pre-existing noise levels at and around the Site. However, due to reduced road traffic volumes and general activity in line with government guidelines relating to the ongoing Coronavirus pandemic at the time of the technical assessments discussed herein, it was not considered possible to obtain representative noise levels at noise sensitive receptors around the proposed development site. In addition, noise surveys at and around the site would have been compromised by noise from ongoing construction activities in the area, including the operation of the temporary concrete batching plant on Great Jackson Street close to the site.

9.75. Therefore, and in line with guidance published by the Association of Noise Consultants [ANC] and the Institute of Acoustics [IOA] 'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments', in order to establish the typical noise levels at and around the site, reference has been made to the results of previous environmental noise surveys undertaken by Fisher Acoustics around the development site. This approach has been discussed and agreed with Laura Miller, Environmental Protection Officer at Manchester City Council.

9.76. Manned surveys of the existing noise environment at sensitive locations at and around the Site were carried out by Fisher Acoustics Ltd over daytime periods on Tuesday 3 November 2015,

Thursday 5 November 2015 and Wednesday 23 November 2015 and overnight time periods on Saturday 19 September 2015 and Thursday 19 November 2015.

9.77. The measurement locations were selected in order to determine the pre-existing noise levels able to impact upon the various facades of the Proposed Development due to environmental noise sources. In addition, measurement locations were selected to determine the pre-existing background noise levels at the existing residential properties close to the Site.

9.78. 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. Full survey details are given in Appendix 9.1.

- Location 1: 20 metres from Mancunian Way (A57(M)) at a microphone height of 15.0 metres above street level
- Location 4: At SE corner of Tower 2 at a microphone height of 1.5 metres above street level
- Location 5: At SW corner of Tower 1, at position of closest residential façade to Great Jackson Street, at a microphone height of 1.5 metres above street level
- Location 8: At SE edge of site, adjacent to River City residential building, at a microphone height of 1.5 metres above street level
- Location 9: At SE corner of site, adjacent to The Boatmans residential building, at a microphone height of 1.5 metres above street level

9.79. Ground floor measurements at the location of Plot F would not be representative of the potential road traffic noise levels from Mancunian Way that would be able to impact on the upper floor levels of the buildings that will have clear line of the carriageway. Therefore, the noise surveys included elevated noise measurements at location 1 close to the Mancunian Way. The measured noise levels can then be corrected to take into account the attenuation of noise due to geometrical spreading (distance attenuation).

9.80. The long-term noise environment at and around the Application Site is principally determined by road traffic on the Mancunian way (A57(M)).

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

Table 9.11: Summary of measured environmental noise levels – existing and proposed receptors

Location	Measured Noise Level Daytime (defined as 0700 to 2300) dB, L_{Aeq}	dB, L_{Amax}	dB L_{A90}	Night time (defined as 2300 to 0700) dB, L_{Aeq}	dB, L_{Amax}	dB L_{A90}
1	68 (slow moving traffic) 75 (free flowing traffic	70 to 92	62 to 64	74	75 to 91	57 to 74
4	-	-	-	54	56 to 64	51 to 43
5	61	70 to 80	47 to 49	55	56 to 73	48 to 56
8	56	61 to 65	54 to 55	57	60 to 63	55 to 56
9	56	61 to 67	53 to 54	56	59 to 65	52 to 54

9.82. In addition to the pre-existing noise sources that contribute to the noise levels identified in Table 9.11, the planning-approved developments at Plot E and Plot G that form part of the Great Jackson Street Development Framework will introduce new potential long-term noise sources in relative proximity to the Proposed Development. These new noise sources include amenity areas and fixed building services plant.

9.83. Music noise egress from the proposed amenity areas will be controlled in line with the applicable planning conditions, such that music noise is not audible at the Proposed Development.

9.84. Similarly, noise from building services plant serving the various proposed buildings at Plot E and plot G is to be controlled by the applicable planning conditions, such that plant noise is lower than the pre-existing background noise levels at the Proposed Development.

Vibration

9.85. 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

9.86. 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

9.87. With reference to the guidance discussed above and the results of the noise surveys, the threshold values for potential significant effects are as given in Table 9.12.

Table 9.12: Threshold noise values for potential significant effect due to construction

Location	Threshold Values, daytime dB, L_{Aeq}
A: Deansgate Square (residential)	65
B: The Boatmans (residential)	65
C: River City (residential)	65
D: City South (residential)	65
E: Plot G (residential)	65
F: Plot E (residential)	65

9.88. It should be noted that Plot E and Plot G of the GJS framework area are not yet under construction and it may be the case that the construction of Plot F is completed before Plot E and Plot G are occupied. Plots E and G may not therefore be active sensitive receptors during the construction phase of the proposed development.

9.89. In order to estimate the likely levels of noise from construction activities at the development 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).

9.90. 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.

9.91. For large construction vehicles that will travel to and from Site, additional calculations have been carried out for the maximum number of expected movements per hour, speed and average travel distance from each receptor.

9.92. 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;

- Telehandler.

9.93. With regard to construction traffic, it has been estimated that in the worst case during concrete deliveries, 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. However, it is understood that the Proposed Development will have access to the off-site concrete batching plant that lies adjacent to the Site. Given the proximity to the plant, it is expected that vehicle movements associated with concrete deliveries and the potential noise impact of such deliveries will be significantly reduced.

9.94. 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.

Table 9.13: Calculated noise levels at sensitive receptors during construction phases

Receptor	Calculated noise levels during construction phase (dB LAeq)		
	Demolition worst case/typical	Excavation/Piling worst case/typical	Frame Construction worst case/typical
A: Deansgate Square (residential)	79 / 75	75 / 73	74 / 72
B: The Boatmans (residential)	60 / 59	77 / 74	73 / 69
C: River City (residential)	56 / 54	69 / 67	67 / 66
D: City South (residential)	57 / 53	72 / 71	70 / 67
E: Plot G (residential)	77 / 72	76 / 73	73 / 71
F: Plot E (residential)	87 / 80	76 / 73	72 / 69

9.95. 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.

9.96. 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)		
	Demolition **worst case/typical**	**Excavation/Piling** **worst case/typical**	**Frame Construction** **worst case/typical**
A: Deansgate Square (residential)	+14 / +10	+10 / +8	+9 / +7
B: The Boatmans (residential)	-5 / -6	+12 / +9	+8 / +4
C: River City (residential)	-9 / -11	+4 / +2	+2 / +1
D: City South (residential)	-8 / -12	+7 / +6	+5 / +2
E: Plot G (residential)	+12 / +7	+11 / +8	+8 / +6
F: Plot E (residential)	+22 / +15	+11 / +8	+7 / +4

9.97. 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 9.15: Potential impact of construction noise, without mitigation

Receptor type and location	Potential noise impact)		
	Demolition **worst case/typical**	**Excavation/Piling** **worst case/typical**	**Frame Construction** **worst case/typical**
A: Deansgate Square (residential)	Major Adverse	Moderate	Moderate
B: The Boatmans (residential)	Neglibible	Major/Moderate Adverse	Moderate Adverse
C: River City (residential)	Neglibible	Minor Adverse	Minor Adverse
D: City South (residential)	Neglibible	Moderate Adverse	Moderate/Minor Adverse
E: Plot G (residential)	Major Adverse	Major/Moderate Adverse	Moderate Adverse
F: Plot E (residential)	Major Adverse	Major/Moderate Adverse	Moderate/Minor Adverse

9.98. Major Adverse effects are expected during the demolition of the existing low-rise industrial unit on the site. However, the unit is relatively small and the relatively short space of time required to demolish the unit should avoid major impacts.

9.99. The only other Major Adverse effects could arise during the piling and excavation of the site, when the machines on site are at the closest points to the receptors. This adverse effect is only expected to prevail for relatively short periods of time when construction works are taking place at the building perimeters closest to the receptors in question. When noisy construction activities are taking place at a more typical distance from this receptors, major adverse effects should be avoided.

9.100. Given the potential adverse effects, measures to mitigate construction noise would be appropriate.

9.101. 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.

9.102. 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.

9.103. The impact of construction vibration on existing sensitive receptors is therefore expected to be Negligible.

Operational Noise

Building Services Plant

9.104. At this design stage, the specific total building services 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.

9.105. In line with the assessment methodology detailed in BS4142:2014 'Methods for rating and assessing industrial and commercial sound', in order to avoid potential noise nuisance at existing and proposed sensitive receptors, the non-emergency building services plant at the Proposed Development should be selected and suitably attenuated so as to achieve noise levels in line with those stated in Table 9.16. It should be noted that the noise limits in Table 9.16 relate to the simultaneous operation of all plant serving the Proposed Development. The stated criteria are on the basis that the installed plant items are not tonal. Given compliance with the noise limits in Table 9.16, the predicted noise effects would be negligible and therefore not significant

Table 9.16: Cumulative environmental noise limits for non-emergency building services plant

Location	Noise Level, dB LAeq	
	Daytime (07:00hrs to 23:00hrs)	Night time (23:00hrs to 07:00hrs)
Residences, 'River City'	47	41
Residences, 'The Boatmans'	48	47
Residences, Hill Quays	49	49
Plot G, Great Jackson Street	47	41
Plot E, Great Jackson Street	43	45
Deansgate Square, South Tower	43	45
Deansgate Square, East Tower	43	42
Proposed Residences, Plot F1	49	49
Proposed Residences, Plot F2	49	49

9.106. Building services plant with tonal characteristics should be avoided if possible. If such plant is provided such that tonal noise is significant at the receptors in question, then the noise limits given in Table 9.16 must be reduced by 5dB in order to comply with the published requirements of Manchester City Council.

9.107. 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 (perhaps test runs of thirty minutes every two weeks). 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 LAeq noise level) at any proposed or existing residential receptor.

9.108. 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 9.17: Cumulative environmental noise limits for emergency building services plant

Location	Noise Level, dB LAeq Daytime (07:00hrs to 23:00hrs)
Residences, 'River City'	66
Residences, 'The Boatmans'	66
Residences, Hill Quays	66
Plot G, Great Jackson Street	67
Plot E, Great Jackson Street	71
Deansgate Square, South Tower	71
Deansgate Square, East Tower	71
Proposed Residences, Plot F1	71
Proposed Residences, Plot F2	71

Noise Egress from Amenity Spaces

9.109. In order to avoid potential noise nuisance to existing noise sensitive receptors, activity noise egress from the proposed amenity spaces within the Proposed Development must be controlled. As the proposed space may potentially employ music replay, suitable limits relating to music noise egress from the proposed areas must be established.

9.110. 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 10dB 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.

9.111. 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 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 9.18: Maximum allowable external music noise levels due to proposed amenity spaces

Location/period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Residences, Deansgate Quay (0700 to 2300)	51	43	38	36	38	32	25
Residences, Deansgate Quay (2300 to 0700)	49	40	37	38	39	33	25
Residences, River City (0700 to 2300)	51	42	41	39	40	33	21
Residences, River City (2300 to 0700)	49	40	37	37	40	34	21
Residences, The Boatmans (0700 to 2300)	51	42	41	39	40	33	21
Residences, The Boatmans (2300 to 0700)	49	38	37	37	40	34	21
Residences, Hill Quays (0700 to 2300)	50	41	41	40	42	35	26
Residences, Hill Quays (2300 to 0700)	49	40	38	39	41	35	26
Proposed Residential Towers (0700 to 2300)	50	41	41	40	42	35	26
Proposed Residential Towers (2300 to 0700)	49	40	38	39	41	35	26

Noise Affecting the Proposed Development

9.112. The sensitive areas of the Proposed Development that could be affected by the noise levels summarised in Tables 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.

9.113. An AVO Strategy is provided withing the Planning and Tall Building Statement details the response to the recommendations of the Acoustics, Ventilation and Overheating, Residential Design Guide.

Mitigation Measures

Construction

9.114. 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.

9.115. 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.
- The Contractor should generally comply with the guidance and procedures given in BS5228: 2014.

9.116. Given the implementation of the above best practice measures, the impact of construction noise is expected to be negligible. Minor adverse effects during excavation and piling may be possible at The Boatmans. Given the relatively short term nature of these activities, these minor adverse effects are not considered to be significant

Operation

Building Services noise

9.117. 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.

9.118. 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

9.119. Environmental noise limits relating to activity noise egress from the proposed amenity space have been established to ensure compliance with published guidelines.

9.120. Given compliance with the external music noise limits given in Table 9.18, the noise impact of the amenity spaces within the Proposed Development is expected to be negligible and therefore no mitigation is required.

Cumulative Effects

Construction

9.121. There is expected to be an overlap of construction works at the Site and at other buildings within the Great Jackson Street Strategic Development Framework area. However, the other developments sites are at a greater distance from many of the closest buildings to the Site and are expected to be at a difference 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 9.116 above, the cumulative effect of construction noise following mitigation is expected to be negligible at the majority of receptors, with potential Minor adverse effects at The Boatmans during excavation and piling activities. Given the relatively short term nature of these activities, these minor adverse effects are not considered to be significant.

Operation

9.122. 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.

9.123. 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.

9.124. Operational noise limits due to mechanical services at the Proposed Development have been derived using the methodology and assessment criteria given in BS4142: 2014. 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. 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

9.125. Table 9.19 summarises the post-mitigation residual effects.

Table 9.19 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Major to Moderate adverse construction noise	Local residents	Para. 9.111 & 9.112: Solid screening around Site. Communication with City Council and local residents. Application of 'Best Practicable Means' and noise control guidance from BS5228.	**Negligible to Minor Adverse construction noise effects**
Operational Phase			
Negligible building services plant noise effects	Residential properties	Para. 9.102: Adherence to environmental noise limits for plant	Negligible building services plant noise effects
Negligible activity noise effects from amenity space	Residential properties	Para. 9.108: Adherence to environmental noise limits for amenity spaces	Negligible activity noise effects from amenity spaces

Summary

9.126. At Plot F, Great Jackson Street, Manchester, it is proposed to build a residential development that includes primarily residential space with ground floor and first floor amenity space.

9.127. As agreed with Manchester City Council, reference has principally been made to previously-conducted noise surveys at and around the Site to establish the pre-existing conditions at nearby noise–sensitive properties.

9.128. Noise levels as a result of construction work during the construction period is expected to lead to moderate to major adverse impact if no mitigation measures are in place. Therefore, construction impact will be minimised by the mitigation methods described in BS 5228. Low noise and vibration construction methods will be used wherever practicable and appropriate acoustic screening will be implemented where necessary and practicable. If the identified mitigation methods are employed, the impact of the construction work during the construction period is expected to be negligible.

9.129. The impact of construction vibration on existing sensitive receptors is expected to be negligible.

9.130. The principal long-term potential environmental noise source due to the operation of the Proposed Development is building services plant. Building services plant noise emissions from the Proposed Development will be controlled through careful design and specification of building services plant and by provision of acoustic screens and attenuators where required, to meet the noise emissions criteria at each noise sensitive receptor at and around the Site. As such, negligible impact is expected.

9.131. The minimum required sound insulation performance of the curtain wall to the dwellings of the Proposed Development has been identified. Compliance with the performance criteria should ensure that the impact of environmental noise levels at the Site on the occupants of the Proposed Development is negligible.

9.132. External noise criteria have been specified for the allowable levels of activity noise egress from the proposed amenity space. Compliance with the criteria would lead to negligible noise effects at sensitive receptors.

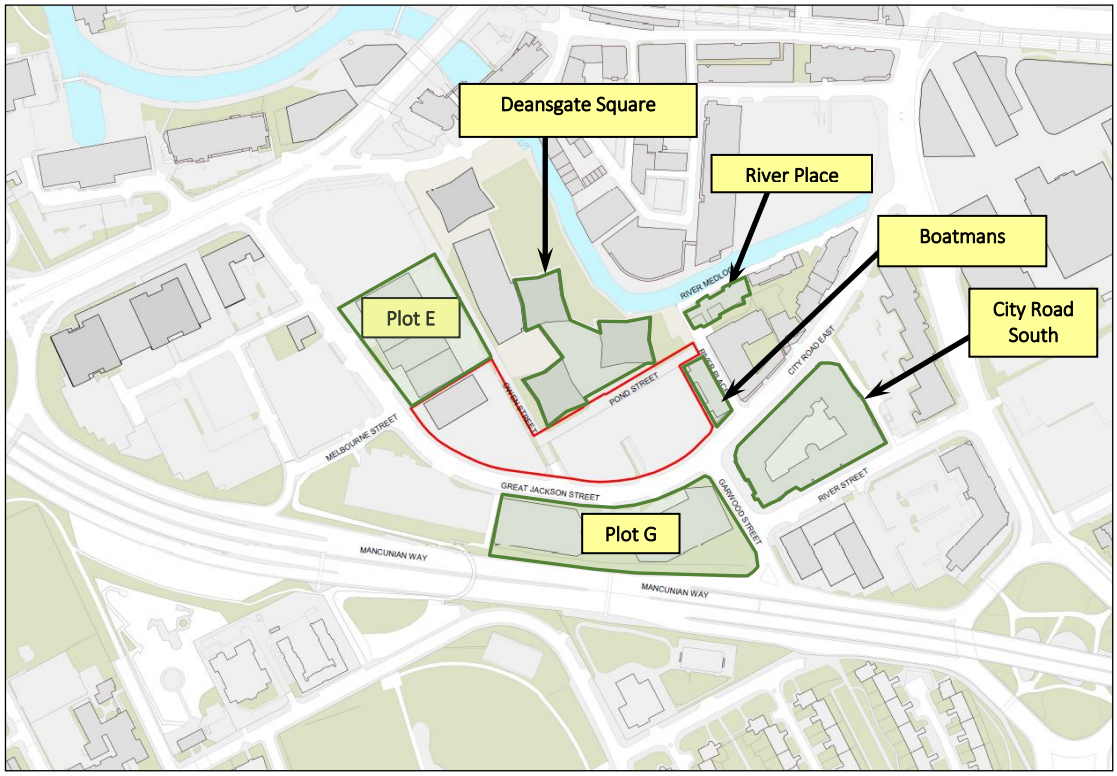


	Figure:	9.1		
	Title:	Nearest noise sensitive premises to Plot F		
	Project:	Great Jackson Street Plot F		
	Date:	05/11/2021	Scale:	N/A

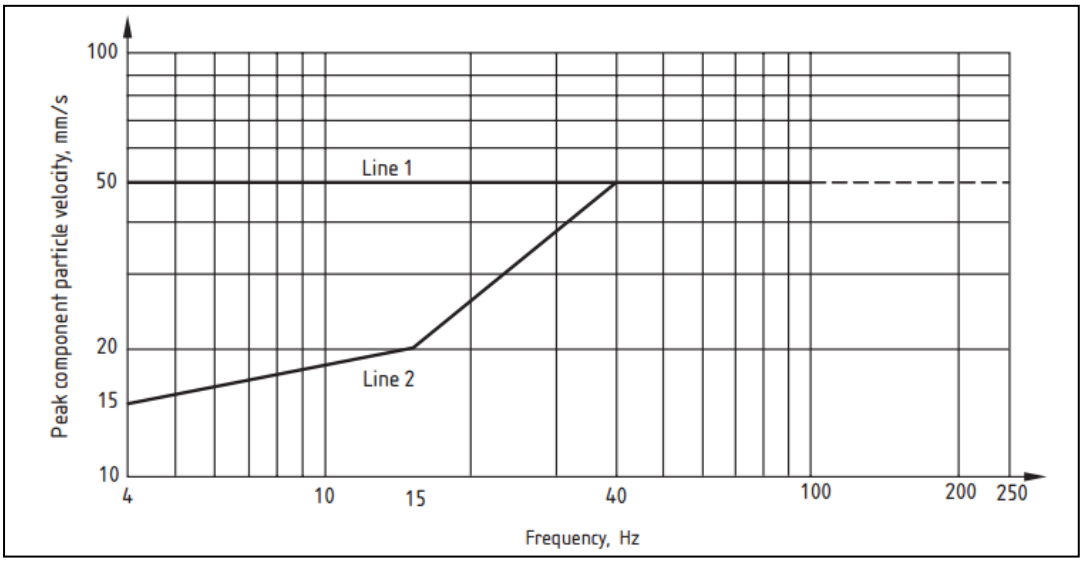


Figure:	9.2		
Title:	Transient vibration guide values for cosmetic damage		
Project:	Great Jackson Street Plot F		
Date:	05/11/2021	Scale:	N/A

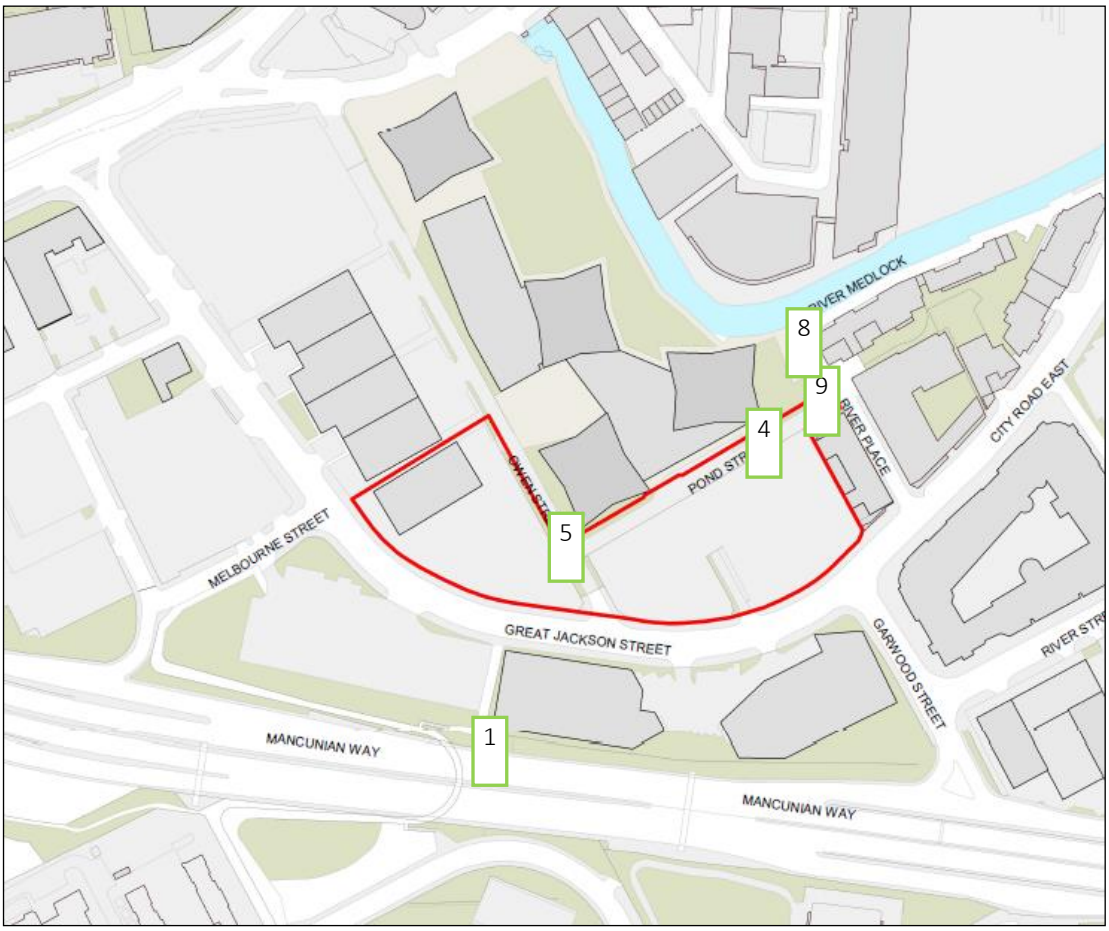


Figure:	9.3		
Title:	Noise survey measurement locations		
Project:	Great Jackson Street Plot F		
Date:	05/11/2021	Scale:	N/A

10. Human Health

Introduction

10.1. This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to human health. 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 negative effects; and the likely residual effects after these measures have been adopted. The proposal is for a high quality residential scheme across two 51 storey towers alongside publicly accessible and private public realm.

10.2. This chapter has been prepared by Barbara Carroll 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 development project proposals in Manchester. She is a co-author of the practical guide - *The EIA Handbook* (Telfords, Third Edition, November 2019).

Legislative and Policy Context

National Planning Policy

National Planning Policy Framework (NPPF, updated 2019 & revised 2021[43])

10.3. The revised NPPF acknowledges the importance of considering health impacts during the planning process and covers many issues that are directly related to the determinants of health. The NPPF identifies the three overarching objectives – economic, social and environmental – that are *interdependent and need to be pursued in mutually supportive ways* in order to achieve sustainable development (paragraph 8). The social objective should support "*strong, vibrant and healthy communities… by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being.'*

10.4. Chapter 8 covers promoting healthy and safe communities, acknowledging that planning policies and decisions should aim to achieve healthy, inclusive and safe places which:

"a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages.

"b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas; and

"c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green

[43] https://www.gov.uk/government/publications/national-planning-policy-framework--2

infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling." (paragraph 92).

10.5. Social, recreational and cultural facilities and services should 'support the delivery of local strategies to improve health, social and cultural wellbeing for all sections of the community (paragraph 93). It is important that sufficient choice of school places is available to meet the needs of existing and new communities (paragraph 95). Public safety should be promoted and "take into account wider security and defence requirements" (paragraph 97).

10.6. *"Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and wellbeing of communities*" (paragraph 98). Sustainable transport should be promoted and this "*can help improve air quality and public health*" (paragraph 105). "*An effective use of land should be promoted in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions"* (paragraph 119). *"Developments should create places that are safe, inclusive and accessible and which promote health and wellbeing…"* (paragraph 130). *"New development must be appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health…"* (paragraph 185).

Public Health England (PHE) Strategy[44] (2019)

10.7. Sets out how PHE intends to protect and improve the public's health and reduce inequalities during 2020 to 2025. The Strategy recognises that the longer term, societal drivers of change represent the principal challenge facing the public's health. However, there are opportunities now, including "*place-based approaches"*. The 10 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 10 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"*.

Local Planning Policy

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

10.8. 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 CC1 Primary Economic Development Focus: City Centre and Fringe states that the focus of employment growth is in the City Centre and will be a suitable location for consideration of high density buildings.
- Policy CC3 Housing advises that the most intensive development of housing will be in the City Centre.

[44] *Public Health England (2019) Strategy 2020-2025*

- Policy CC6 High Density Development is a location where land should be used to maximise its efficiency.

- Policy CC7 Mixed Use Development guides that the City Centre presents the most viable opportunities for mixed use development.

- Policy CC10 A Place for Everyone advises that the City Centre will develop as a location which appeals to a wide range of residents and visitors.

- Policy EC1 Employment and Economic Growth in Manchester requires development proposals to make the best possible use of a site in terms of efficient use of space and including application of best practice in security design.

- Policy H1 Overall Housing Provision defines high-density developments as those with over 75 units and states that they are appropriate in the City Centre.

- Policy H12 Purpose Built Student Accommodation (PBSA) will be supported where the development satisfies certain criteria.

- 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 & 11 safeguard and create new open space, sport & recreation facilities.

- Health is further protected through Policies EN14 Flood Risk, EN16 Air Quality, EN17 Water Quality, and EN18 Contaminated Land & Ground Stability

- Policy T1 Sustainable Transport requires “delivery of a sustainable, high quality, integrated transport system to encourage modal shift away from car travel… and to prepare for carbon free modes of transport”.

- Policy T2 will actively manage the pattern of development to ensure that there are accessible areas of opportunity and need.

- Policy T3 supports proposals that contribute to an economically and environmentally sustainable transport network through strategic integration of strategic transport projects. Progression towards sustainable transport will promote healthier living and well-being.

- Policy DM1 Development Management requires that all development should have regard to specific issues including “Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation”; Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes”; “Community safety & crime prevention”; and “Design for Health.

Great Jackson Street Development Framework (update 2018)

10.9. The Development Framework Vision remains and is to 'create a vibrant, safe, secure and sustainable community'.

Places for Everyone – Joint Development Plan (Greater Manchester Councils 2021)[45]

10.10. The Greater Manchester Spatial Framework (GMSF, Publication Draft, 2020) has now been withdrawn but nine of the previous ten Councils have agreed to progress with a Joint Plan that will build upon the evidence base already collected. It may be noted that the GMSF Vision includes GM 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".*

Other Relevant Policy, Strategy & Guidance

Public Health England (PHE) Spatial Planning for Health (2017)[46]

10.11. 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)[47]

10.12. 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. 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*".

The Manchester Strategy - Our Manchester (2016)[48]

10.13. The Manchester Strategy to 2025 comprises the Vision and five themes for the strategy including a progressive and equitable city where "*health will improve…*".

Scope of the Assessment

10.14. Human health and well-being - or quality of life - are affected by a complex interaction of multiple factors. There are various definitions of wellbeing and quality of life. For the purposes of this health chapter, health-related quality of life is considered to be *"A combination of a person's physical, mental and social well-being; not merely the absence of disease"*[49], as used by the UK National Institute for Health & Care Excellence (NICE).

10.15. The scope of this Chapter has considered the health and wellbeing/quality of life aspects of each of the other technical impact assessments. It has then considered the interactions of factors into

[45] https://greatermanchester-ca.gov.uk/news/greater-manchester-councils-to-set-out-next-steps-with-places-for-everyone-joint-plan/
[46] *Public Health England (2017) Spatial Planning for Health: an evidence resource for planning designing healthier* places
[47] *Public Health England (PHE) Health Impact Assessment in Spatial Planning* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/929230/HIA_in_Planning_Guide_Sept2020.pdf
[48] https://www.manchester.gov.uk/mcrstrategy
[49] UK National Institute for Health & Care Excellence https://www.nice.org.uk/Glossary?letter=H

four themes for healthy urban living – as explained in the following section on methodology. In this way, specific factors for health, such as air quality and climate change, have been addressed, as well as the wider determinants of health that relate to wellbeing/quality of life, such as accessibility of sustainable transport, and improvements to the public realm.

Assessment Methodology and Significance Criteria

10.16. 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[50]. The approach here is proportionate - based on consultation responses, the Scoping Opinion, professional experience, and assessment of impacts against relevant baseline information.

10.17. *Shaping Neighbourhoods: For Local Health and Global Sustainability* (2010)[51] 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.

10.18. The complexities of investigating health impacts are recognised by Public Health England (PHE)[52] 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.

10.19. The London Healthy Urban Development Unit (HUDU) '*Healthy Urban Planning Checklist*' (2017)[53] provides a useful checklist that was developed for London but is applicable to housing development 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 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. For the purposes of this assessment, we have applied the checklist to the proposals.

10.20. This checklist recognises that health and wellbeing can be affected by multiple determinants as shown in Figure 10.1. Changes in certain determinants caused by development may affect the health and wellbeing of existing and new residents. The HUDU checklist interprets these determinants into a set of four themes for healthy urban living that can be used to assess residential development, as follows:

- Healthy Housing
- Active Travel
- Healthy Environment

[50] https://www.iema.net/resources/reading-room/2017/05/01/get-primed-for-health-in-eia

[51] *Barton H, Grant M & Guise R (2nd edition 2010) Shaping Neighbourhoods: for local health and global sustainability Taylor & Francis Ltd, England*

[52] https://fingertips.phe.org.uk/profile/wider-determinants

[53] https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf

- Vibrant Neighbourhoods

10.21. Specific criteria sit under each of these themes to cover a fuller range of determinants. These include access to health and social care, healthy food, freedom from pollution, open space, reducing crime and fear of crime, and access to employment and services.

10.22. The checklist and criteria were used to inform the proposed scope of this Chapter then provided the basis for the assessment stage, where the Proposed Development (including embedded mitigation such as through the design of the project with reduced carbon emissions, enhanced public realm with a gain in street trees, and enhanced accessibility to sustainable transport networks) was considered to each of the relevant determinants to identify the receptors that would be affected.

10.23. The use of checklists helps identify the topics that are relevant to the health impact assessment for the Proposed Development. This Chapter considers the direct implications for health such as the provision of housing and employment. 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 green infrastructure, amenity, cultural and recreational facilities.

10.24. 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 determinants of health and wellbeing. Searches were made through web-based sources and using Google Maps to measure approximate distances by walking or public transport from the centre of the development area to the facility. The proximity of open spaces and walking routes is investigated since access to open space and healthy modes of transport also contributes to healthier lifestyles and wellbeing.

10.25. Findings from the Socio-Economics Assessment (Chapter 15) are integrated as necessary taking into account the benefits arising from the Proposed Development, and the effects on demand for social and community infrastructure. Provision of good quality housing, access to employment and social infrastructure/open space are known to have positive effects on health and wellbeing. The summary findings from the Townscape & Visual Impact studies (Chapter 12) are considered as the quality of the local environment affects health and wellbeing. The Transport studies (Chapter 13) are considered since access to sustainable modes of transport contributes to improvements in health and wellbeing.

10.26. The key findings from the Air Quality (Chapter 6); Climate Change (Chapter 7); Daylight, Sunlight & Overshadowing (Chapter 8); Noise & Vibration (Chapter 9); Solar Glare (Chapter 11); Townscape (Chapter 12); Transport (Chapter 13); and Wind (Chapter 14) 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.

10.27. 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; Heathy Environment; and Vibrant Neighbourhoods. Thus, any significant impacts for human health are clearly presented in a separate chapter. The key impacts for health are considered and inter-relationships are integrated within the four key themes identified for healthy urban living.

10.28. The proposed scope uses the approach as outlined above. This chapter on health is not a Health Needs Assessment and does not attempt to quantify health care contributions. The geographical scope is determined by receptor groups that are likely to be significantly affected by the proposed development.

10.29. Therefore, the scope of the Chapter is in part dependent upon the study areas and potential receptors identified in the other technical assessments (such those for socioeconomics, visual impact, transport, noise, and air quality). Thus, the study area comprises the proposed development site with local surrounds in the City Centre, the wider study area of Manchester City, together with any implications for the North West of England – as applicable to each of the factors relevant to human health and wellbeing for the proposed project.

10.30. 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

10.31. 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 2021)[54], published local authority health profiles through Public Health England (PHE, 2017-2019)[55] and Office for National Statistics (ONS) for health and life expectancies (2017-2019)[5657], and as reported by Manchester City Council[58].

10.32. The key baseline from the other technical topics is considered, such as capacity of local facilities and employment/local expenditure statistics identified in the socio-economics assessment, and risks to health/wellbeing such as from air quality and noise/vibration, and risks associated with the effects of climate change. 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.

10.33. The Institute of Environmental Management & Assessment (IEMA) paper on Health in EIA (2017)[59] 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

[54] https://www.manchester.gov.uk/info/500230/joint_strategic_needs_assessment
[55] https://fingertips.phe.org.uk/profile/health-profiles
[56] https://www.ons.gov.uk/peoplepopulationandcommunity
[57] Life expectancy for local areas of the UK - Office for National Statistics (ons.gov.uk)
[58] https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/2178/health_and_wellbeing
[59] *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

increase or decrease in the number of additional cases of a particular physical or mental health outcome.

10.34. 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 or population level?
- Are mitigating measures available and is it reasonable to require these?

10.35. 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 2.3 in the EIA Methodology (Chapter 2). The criteria and categories of significance applied in the 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.
- Moderate Adverse/Beneficial – modest important local effects that, if adverse, are not likely to be key issues for decision-making.
- Minor Adverse/Beneficial – Slight, short, or highly localised effects that, if adverse, are unlikely to be important in the decision-making process.
- Negligible – no appreciable effects on health factors.

10.36. 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 socioeconomics; townscape & visual; traffic & transport; air quality; noise and vibration; daylight, sunlight and overshadowing; solar glare; climate change; and wind. Then, the overall likely significant effects on health have been determined in a qualitative way using professional judgment.

Limitations and Assumptions

10.37. 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 9);

Solar Glare (Chapter 11); Townscape (Chapter 12); Transport (Chapter 13); Wind (Chapter 14); Socio-Economics (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 well-being is considered to be appropriate and proportionate such that there are no limitations. The assessment, set out in this ES Chapter, is desk-based and with professional judgment using published information.

Baseline Conditions

10.38. **Health Profiles**: MCC has developed its own population forecasting model and this estimates that the residential population in 2019 was 576,500, compared to 568,100 in 2018. The higher figure is associated with high levels of construction, numbers of international students, and increasing demand for school places[60]. The rate of city population growth is likely to increase to over 627,000 by 2025. The Manchester State of the City Report (2020)[61] notes that Manchester has a much younger age profile than England with an annual growth of twice the national population for residents aged 20-39. The Report summarises that despite recent improvements, Manchester still has some of the worst health outcomes in the country and there are significant inequalities within the city (health and unemployment).

10.39. According to ONS data (2017-2019), life expectancy at birth for Manchester is 76.4 (males) & 80.3 (females) compared with 79.8 (males) & 83.4 (females) averaged for England. The most recent data (2018-2020) shows that life expectancy has actually gone down by 3 months in the North West, which highlights the need to continually strive to improve health outcomes through our built environment.

10.40. The Proposed Development is located on Great Jackson Street in the City Centre – in the 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). The Index of Multiple Deprivation (IMD) is an overall relative measure of deprivation constructed by combining seven domains of deprivation. The Deansgate Ward has a IMD score of 15.5-31.1 (i.e. least deprived with 48.4-62.7 indicating the most deprived), similar to the adjacent Piccadilly Ward. The Deansgate Ward also shows good health when other indicators are considered such as emergency hospital admissions, households in fuel poverty, and incidents of cancers. Childhood obesity is in the medium range for the city centre Piccadilly and Deansgate Wards, those Wards to the north and south have less, whilst Wards to the east have more childhood obesity. Reported street crime is high in the City Centre, as with other nearby Wards. Unemployment is low in the city centre.

10.41. **Socio-Economics-Local Population**: No people currently reside at the Site. There is a rapidly growing population in Manchester City Centre and with a significantly denser population than all other areas of Manchester. The local assessment area comprises Deansgate Ward, Piccadilly Ward, and the adjacent Hulme Ward. 92% of the population of the assessment area is of working age – significantly higher than the proportion in other wards.

10.42. **Socio-Economics-Housing:** There are no existing residential units on the Site.

10.43. **Socio-Economics-Employment:** Employment data for the assessment area (Deansgate Ward, Piccadilly Ward, and the adjacent Hulme Ward) indicate that there are a significant proportion of

[60] https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/438/population/2
[61] https://www.manchester.gov.uk/downloads/download/7316/state_of_the_city_report_2020

people employed in professional, scientific, and technical activities. Administrative, support services, and education are the next most prevalent sectors by employment in the area – and overall, the area is a centre for high-skilled service jobs. Jobs in the assessment area account for some 51% of the total employment in Manchester.

10.44. Socio-Economics-Healthcare Facilities: There are 8 GP practices within 1 mile of the site with 6 of these accepting new NHS patients. There are 28 dental practices within 2 miles of the site; 9 of which are not accepting new patients based on available data, but the other 19 may take on new patients.

10.45. Socio-Economics-Educational Facilities: There are 10 day nurseries within 1.2 miles from the Site and, of which, 5 indicate they have available spaces. There are 9 primary schools within a 1.2 mile radius of the Site and, from available data, there are 285 total school places available. There are 11 secondary schools within a 3 mile radius of the Site, with some 2,200 available places.

10.46. Socio-Economics-Crime: The policing priorities for the area relate to anti-social behaviour, vehicle crime, and theft. Violent crime, anti-social behaviour and theft from a person accounted for about half of all crimes recorded within 0.5 mile radius of the Site.

10.47. Socio-Economics-Open Space, Recreation & Amenity: There are 4 parks and public green spaces within a 1 km radius of the Site, and a number of gyms and leisure/sports centres within 1.5 km of the Site.

10.48. Townscape and Visual Impact: The centre of Manchester is undergoing major new development with construction that may affect most of the inner-city character zones in some way – including the Civic Quarter with many old but also new office buildings; Petersfield with landmark buildings such as Manchester Central, Bridgewater Hall and Great Northern Warehouse; and Castlefield with its Urban Heritage Park and is one of Manchester's key tourist destinations. The Great Jackson Street area is the focus of considerable regeneration in recent years and tall buildings have become key components of the townscape character, including Deansgate Square, Crown Street Phase 1, and River Street. Thus, the existing skyline is characterised by structures of varying heights, shapes and profiles, with a range of uses. The Site is in close proximity to tall buildings that are either existing or under construction.

10.49. Traffic and Transport: The Site is at Great Jackson Street in the city centre, with the Mancunian Way A57(M) close to the south. Owen Street, a privately owned road, links the site area to Deansgate. Road safety is not a current concern. The Site is well located to various public transport routes and interchanges; the Manchester accessibility index score is the highest level indicating excellent accessibility (bus, Metrolink, rail). It is highly accessible by bicycle with multiple on- and off-road cycle routes nearby and also highly accessible by foot to various employment, education, retail, and leisure facilities.

10.50. Air Quality: The Site is within the Greater Manchester Combined Authority AQMA and declared for nitrogen dioxide NO_2. The most recent information for 2020[62] concluded that long-term trends have shown an improvement in air quality, but some areas are still above the annual mean NO_2 Air Quality Objective (AQO). A review of recent monitoring results within the vicinity of the Site indicated that annual mean NO_2 concentrations adjacent to the Site may be marginal to or exceed the AQO.

[62] https://cleanairgm.com/monitoring-reports/

10.51. Noise and Vibration: The long-term noise environment at and around the Site is principally determined by road traffic on the Mancunian Way (A57M). Noise measurement locations were selected to determine the prevailing ambient noise level at existing local sensitive buildings and for assessing the noise levels able to impact on the facades of the Proposed Development. There are no major sources of vibration in proximity to the Site.

10.52. Daylight, Sunlight and Overshading: The current use of the Site is surface carparking and construction compound for adjacent new developments, and as such, it has an unusually open aspect for the Great Jackson Street area. Overall, the current situation for overshadowing was found to have moderate compliance for sun hours according to BRE criteria – and due to its city centre context.

10.53. Solar Glare: Glare of solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings and it is only likely to be an issue for some heavily glazed or mirror clad buildings. The existing use of the Site is as a construction compound and surface car parking and as such there is limited opportunity for solar glare.

10.54. Climate Change: The current use of the Site as a parking lot is associated with some traffic flows and therefore some carbon emissions. No operational building emissions from energy consumption are generated. MCC declared a Climate Change Emergency with a target of achieving net zero carbon by 2038.

10.55. Wind Microclimate: The local area is characterised by regeneration and including tall buildings that have become a feature of the townscape. The baseline conditions for assessing the wind microclimate effects were the area within the site boundary and the existing properties that might be affected by the proposals.

Identification and Evaluation of Significant Effects and Mitigation Measures

10.56. This Section sets out both the likely effects prior to mitigation and the mitigation measures that are suggested within each chapter to reduce any potentially significant impacts. Residual impacts are set out in Table 10.1 to the end of this chapter to set out the effects post-mitigation. The effects are set out under each topic area below.

10.57. Socio-Economics-Housing: The delivery of 988 new homes will make a contribution to Manchester's housing growth targets and support the proposed focus for much of the housing growth to be delivered in the city centre. High density development also helps to ensure there are sufficient sites to accommodate forecast population and employment growth in the city centre. This is considered to be Minor Beneficial at the assessment area and the local authority scale.

10.58. Socio-Economics-Employment and Local Expenditure: During the construction phase, the number of construction workers on Site will vary dependent on requirements at each stage. Whilst construction companies often use their own workers, a proportion is expected to be drawn from the local area and it is estimated that the construction of the Proposed Development will support around 2,100 FTE jobs and generate some Gross Value Added GVA of £165m. There will also be further indirect effects as a result of spill-over through the supply chain and knock-on consumer spending as a result of wages, indicating an extra 4,800 FTEs and GVA of £380m. These effects are considered to have a temporary short-term Minor Beneficial effect at the local authority level. The construction workers are expected to generate local expenditure while working at the Site and this is estimated to be some £1.8m over the course of

the construction period and this is considered to be temporary and **Minor Beneficial** at the local level.

10.59. During the operational phase, the additional households accommodated in the Proposed Development will support additional household spend, and this is estimated to be some expenditure of £11.6m that is sufficient to support 80 FTEs. This is considered to be **Minor Beneficial** at the local level. The addition of new homes in the assessment area will generate additional Council Tax revenue for the City Council and this is estimated to be £1.4m annual income that will support delivery of services across the local authority – considered to be **Minor Beneficial** for the area.

10.60. **Socio-Economics-Healthcare Facilities**: Local GP and dental practices are accepting new patients and it is considered that much of the additional demand could be absorbed by the existing healthcare facilities. The Proposed Development is expected to accommodate a relatively young demographic, supported by the age profile of the assessment area with 93% under the age of 50, and perhaps indicating a lower demand for health services. The Site is located in a highly accessible and well-connected area providing sustainable transport links, including to hospitals approximately 1 mile away. Overall, the impacts are considered to be **Negligible** at the local scale.

10.61. **Socio-Economics-Educational Facilities:** Additional demand for school places is expected from the uplift of residents in the area. As well as the schools currently in the area, a primary school is proposed to be built as part of the Crown Street Phase 2 further adding to the available capacity in the immediate surrounding area. It is estimated that there would still be additional capacity available in the schools such that the impacts of the Proposed Development on education provision is **Negligible**.

10.62. **Socio-Economics-Open Space, Recreation and Amenity:** Additional use of open spaces and increased demand for recreational facilities is to be expected from the uplift in population. However, there is a significant range of such facilities in the assessment area and a variety of open spaces within walking distance. The Proposed Development will add 0.5 ha of new public realm and 0.05 ha of private amenity gardens, and residential amenities include gyms and studios for exercise and socialising. Future residents will also benefit from the leisure and cultural amenities throughout the city centre and therefore, the impacts are considered to be **Negligible**.

10.63. **Socio-Economics-Crime:** The Site is currently occupied by site cabins and surface car parking associated with the nearby construction. The provision of a high-quality residential development with associated public realm increasing connectivity and helping to create a better sense of place and community, can help reduce some types of criminal activity and fear of crime – impacts considered to be **Negligible** at the local scale.

10.64. **Townscape and Visual Impact**: During the construction period that will last for approximately 8 years, potential unsightly visual impacts will be mitigated through high quality hoardings. For the operational phase, the studies investigated 19 viewpoints representing likely sensitive receptors for townscape and visual impacts. Of these 19 viewpoints, 5 were found to have **Negligible** effects from the Proposed Development, 9 were found to have **Minor Beneficial** effects, and 5 were found to have **Moderate Beneficial** effects.

10.65. **Traffic and Transport**: The existing site is currently occupied by site cabins and surface car parking and with a high level of construction activity locally related to adjacent development

sites. During the construction phase, it was determined that there will be a direct, temporary, short-term **(reversible) neutral effect** at the local level which is **Not Significant**. A Construction Environmental Management Plan (CEMP) will be implemented with considerate construction practices and agreed traffic management measures to minimise such local temporary effects.

10.66. During the operational phase, potential issues for traffic and transport were only found to be indicated at one link – No 6 with Melbourne Street. Changes in traffic flows are not predicted to be more than 30% at any of the other 19 road links and therefore no significant effects likely and no further assessment required. Pedestrian delay at Link 6 was found to be effectively no change and therefore neutral at the local level which is **Not Significant**. The effects on pedestrian amenity were found to be slightly adverse locally which is **Not Significant**. There was no change in fear and intimidation, no change in this traffic hazard, and therefore, the significance is neutral locally and **Not Significant**. The overall numbers of vehicles travelling along Melbourne Street is very low and would not create any severance such that effects are slightly adverse locally which is **Not Significant**. No change in collisions and road safety is predicated such that effects are neutral which is **Not Significant**.

10.67. **Air Quality**: 39 sensitive receptors were identified - 34 residential, 4 commercial, and 1 educational. During the construction phase, there is a risk of dust and vehicle exhaust emissions arising from various activities. Only a small volume of buildings is to be demolished such that potential dust emissions related to demolition is small. The amount of potential dust emissions from HGV movements is anticipated to be medium. Overall, the effects from dust/ particulates (PM10) and relevant to human health during the construction phase were found to be Minor Adverse. Effects of dust soiling varied from Minor – Moderate – Major Adverse according to activity. Mitigation measures, such as covering stockpiles, cleaning of vehicles and dampening surfaces, will be detailed and implemented through the CEMP and residual dust effects are then predicted to be **Negligible** which is **Not Significant**. For vehicle exhaust emissions, NO_2 was predicted to be **Negligible** at 37 of the 39 receptor locations, **Minor Adverse at one, and Moderate Adverse at one**; impacts on PM_{10} and $PM_{2.5}$ were Negligible at all 39 receptor locations. Therefore, overall, vehicle pollutant emissions were determined to be **Not Significant**.

10.68. For the operational phase, annual mean NO_2 concentrations were predicted using modelling at sensitive receptor locations. Effects of NO_2 from road exhaust emissions were found to be Negligible at 36 receptor locations, Minor Adverse at one location, and Moderate Adverse at two locations. The overall impacts significance with regard to NO_2 concentrations was then determined to be **Minor Adverse**. PM_{10} and $PM_{2.5}$ concentrations do not exceed the AQO at any receptor locations and thus effects are considered to be **Negligible** and **Not Significant**.

10.69. The Proposed Development includes provision of 10% Active Electric Vehicle Charging Points with additional infrastructure to allow passive provision to enable the active capacity to increase in line with demand in time. This, together with the encouragement of cycling and walking, should reduce the use of vehicles with emissions over time and thus reduce the residual impacts to **Not Significant**.

10.70. **Noise and Vibration**: During the demolition phase and prior to mitigation, Major Adverse effects are expected at 3 of the identified residential locations (Deansgate Square, Plot G, Plot E) with Negligible effects determined for the other 3 identified residential locations (The Boatmans, River City, City South). During excavation/piling and frame construction stages, effects are expected to range from Minor Adverse and Moderate Adverse through to Major/Moderate Adverse at 3 locations during excavation/piling (The Boatmans, Plot G, Plot E). However, such adverse effects are expected to only prevail for relatively short periods of time and only when

works are taking place at building perimeters closets to these receptors. Thus, significant environmental effects are avoided and reduced through provision of hoardings and timings of activities – all implemented through the Construction Environmental Management Plan (CEMP). Potential significant effects are not anticipated to arise with vibration. Overall, residual impacts are considered to be Negligible to Minor Adverse during construction. During the operational phase, the noise impact of mechanical plant is expected to be Negligible, and the noise impact of the amenity spaces within the Proposed Development is expected to be Negligible.

10.71. Daylight, Sunlight and Overshadowing: The studies investigated 10 sensitive receptor residential buildings within the surrounding area with the potential to be impacted by the Proposed Development – identifying windows for assessment of daylight, rooms for assessment of winter and annual sunlight, and two amenity areas were assessed for overshadowing. Daylight effects were identified to be Negligible to Moderate Adverse which is Not Significant taking into account the context of the Site. Sunlight effects were found to be Negligible to Minor Adverse which is Not Significant. For overshadowing, Crown Street Phase 2 will continue to receive sunlight whilst Deansgate Square will not receive sunlight in accordance with the BRE criteria – these effects were identified to be Negligible to Minor Adverse and thus are Not Significant.

10.72. Solar Glare: The impact assessment studies investigated selected viewpoints at nearby road junctions and considered the risk of solar glare affecting drivers' lines of vision and traffic signals that could be affected – and at different times of the day and year. One viewpoint for tram drivers was also scoped into the assessment – for travelling westbound towards Deansgate-Castlefield Station. The studies found that for both road users and tram drivers, the effects from solar glare were likely to be Minor Adverse which is Not Significant. It was noted that once the anodised aluminium panels materiality is known as part of the detailed design process, it is likely that the reflections would be further broken up thus reducing the duration of potential reflections – thus effecting embedded mitigation. It was also noted that as other developments are constructed, the view of the Proposed Development could be obscured and thus reduce instances of solar glare from certain viewpoints.

10.73. Climate Change: Activities during the construction phase would generate GHG emissions, particularly from the manufacture of materials, but also from transportation. Activities during the operational phase would generate GHG emissions, particularly from the replacement and/or refurbishment of building elements. The studies also investigated the estimated emissions from transport during the operational phase and the end of life phase (60 year building lifespan) with GHG emissions from the demolition, waste processing, and disposal of building elements. The total embodied, operational and transport emissions over 60 years were calculated in tonnes of carbon and the results showed that transport carbon emissions are the largest category of emissions for the Proposed Development. Carbon emissions were assessed against the RIBA 2025 Climate Challenge target and effects for embodied carbon indicated as Moderate-Minor adverse, operational carbon as Moderate-Minor Adverse, and transport as Major-Moderate Adverse on the climate. Mitigation measures are suggested including choice of building materials, transport management, electric vehicle chargin, encouragement of sustainable transport, and procurement of energy efficient equipment. Overall, there is likely to be a Moderate Adverse residual effect on climate.

10.74. Wind Microclimate: The studies considered pedestrian comfort and safety for thoroughfares and entrances. During construction any undesirable wind conditions are temporary and as construction of the Proposed Development proceeds, the wind conditions at the Site would gradually vary, approaching those of the completed Proposed Development. During the operational phase, 45 of the 47 receptor locations (thoroughfares and entrances) were

identified to range between **Moderate Beneficial and Moderate Adverse** (offsite) for pedestrian comfort which is **Not Significant**. For 2 receptors (Nos: 5 & 11) Major Adverse effects were indicated, and mitigation is proposed with screening and evergreen hedging such that residual effects will be **Negligible**. All receptors were found to not exceed the criteria for pedestrian safety and effects are Negligible.

Cumulative Effects: Temporary during Construction Phase

10.75. Each separate technical topic has considered the relevant effects for health and wellbeing that could be cumulative with other nearby development projects. Whilst it is acknowledged that this part of Manchester's City Centre has been subject to regeneration over a number of years, 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 Environmental Management Plan (CEMP), and such CEMPs are applied to the construction of each development project.

10.76. During the approximately 8 year construction time period, there are the possibilities for cumulative adverse impacts on air quality - dust soiling from activities and emissions from transport; noise from demolition and construction activities; transport disturbance; and loss of amenity for pedestrians and motorists. However, cumulative effects were identified to be Negligible through implementation of the CEMPs for air quality, transport, and pedestrian and motorist amenity and safety.

10.77. During the construction phase, there are Beneficial effects for employment and local expenditure; in-combination (cumulative) effects arising during construction of nearby development projects have been identified to be Moderate Beneficial and temporary. Provision of employment is known to have positive effects on health and wellbeing.

Cumulative Effects: Operational Phase

10.78. Taking into account other residential developments within 500m of the Site, the cumulative impacts are likely to make a major beneficial contribution to the City's housing needs, including the commitment to higher densities. The cumulative increase of population with an uplift of 14,600 residents could put pressures on facilities and services – for healthcare facilities, **Minor Adverse** is indicated; for education services, **Minor-Moderate Adverse** is indicated. Pressures on local amenity and open space is likely to be mitigated through the cumulative addition of amenity benefits from development including a large park and high-quality public spaces with likely Moderate Beneficial impacts in the longer-term. Overall, likely **Major Beneficial** effects for Healthy Housing. There is little change in townscape and visual impacts with regard to cumulative effects with nearby developments.

10.79. Potential negative effects on environmental factors associated with transport, noise, air quality, carbon emissions/climate change, and flood risk have been mitigated to insignificant effects and the technical studies have not identified any significant cumulative effects with other nearby developments. The proactive facilitation and encouragement of cycling by the Proposed Development and the improvement to the public realm is likely to have synergistic effects with other developments in the area with cumulative beneficial effects in the longer term for Active Travel and Healthy Environments. Associated cumulative impacts on the economy and employment are likely to be **Moderate Beneficial** and to contribute positively to Vibrant Neighbourhoods as employment is known to affect health and well-being.

Residual Effects

Table 10.1 – Summary of Health-Related Topics, Likely Significant Effects, Mitigation Measures, and Residual Effects on receptors identified from each technical chapter and as relevant according to those presented in paragraph 10.29 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Socioeconomics: jobs & employment	Employment and GVA	None needed	**Minor Beneficial**
Socioeconomics: local expenditure	Local expenditure	None needed	**Minor Beneficial**
Townscape and Visual: viewpoint locations	Local viewpoints	High-quality hoardings	**Negligible**
Transport: safety, severance, amenity, delay	Residents, visitors	CEMP	**Minor Adverse** which is **Not Significant**
Air Quality: dust, vehicle emissions	39 sensitive locations	CEMP	**Negligible** which is **Not Significant**
Noise and Vibration	Residents	CEMP	**Negligible to Minor Adverse** which is **Not Significant**
Daylight, over-shadowing	None	None needed	None
Solar Glare:	Nearby junctions	None needed	**Negligible to minor adverse** which is **Not Significant**
Climate Change	The climate	Optimisation of construction processes and locally source materials.	**Moderate-Minor Adverse** which is **Not Significant.**
Wind Microclimate	None	None needed	None
Operational Phase			
Socioeconomics: Housing	Residents	None needed	**Minor Beneficial**
Socioeconomics: Economy	Local expenditure and Council income	None needed	**Minor Beneficial**
Socioeconomics: Education	Residents and Locals	None needed	**Negligible**

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Socioeconomics: Healthcare	Residents and Locals	None needed	**Negligible**
Socioeconomics: Crime	Residents and Locals	None needed	**Negligible**
Socioeconomics: Space and Recreation	Residents and Locals	None needed	**Negligible**
Townscape and Visual Impact	19 viewpoints	None needed	**Negligible (17); Minor Beneficial (2)** which is **Not Signficant**
Transport: safety, severance, amenity, delay	Residents, visitors	None needed	**Neutral to Minor Adverse** which is **Not Significant**
Air Quality: vehicle emissions	Residents, visitors	EV charging points	**Minor adverse** which is **Not Significant**
Noise & Vibration: building services	Residents	Environmental noise limits for plant	**Negligible** which is **Not Significant**
Noise & Vibration: Amenity spaces	Residents	Environmental noise limits for amenity space	**Negligible** which is **Not Significant**
Daylight, Sunlight	10 surrounding residential buildings	None needed	**Negligible** to **Moderate Adverse** which is **Not Significant**
Over-shadowing	Surrounding amenity areas	None needed	**Negligible** to **Minor Adverse** which is **Not Significant**
Solar Glare	Road users & tram drivers	Embedded in design	**Minor Adverse** which is **Not Significant**
Climate Change	The climate	EV charging embedded in the design and sustainable transport, smart metering and A+++ whitegoods.	**Moderate-minor adverse** which is **Not Significant.**
Wind Microclimate	All receptors – pedestrian safety	None needed	Negligible which is **Not Significant.**
Wind Microclimate	Pedestrian comfort Receptor No 5	Evergreen hedging	Negligible which is **Not Significant.**
Wind Microclimate	Pedestrian comfort Receptor no 11	Screens & evergreen hedging	Negligible which is **Not Significant.**
Wind Microclimate	Pedestrian comfort	Planting and wind mitigation as well as embedded design.	**Moderate Adverse to Moderate Beneficial** for

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
	All other receptors		off-site receptors, which is **Not Significant**

Summary

Healthy Housing:

10.80. The Proposed Development will deliver 988 new homes and access to good quality housing is known to have positive effects for health and well-being. The overall design is acceptable within the context of a vibrant city centre area and the Proposed Development complements and fits with the emerging pattern of townscape character in a consistent way, through the embedded mitigation that is integral to the design of the buildings. The Proposed Development once completed was found to have negligible to positive effects on the local townscape character and visual impacts in the local and surrounding areas – all contributing to overall positive effects for Healthy Housing.

10.81. The new homes and their residents are considered to have a negligible effect on the availability of local schools and nurseries, and healthcare facilities, including GP and dental practices. Impacts on the use of local open space, recreational and amenity facilities are also negligible. The change from a site with construction cabins and carparking to a lived-in area will contribute to safety and security. Overall, the Proposed Development will have major positive effects for Healthy Housing.

Active Travel:

10.82. The Proposed Development is located at the heart of the city centre that is rich in choice and accessibility to sustainable transport modes – walking, cycling, bus, Metrolink, rail – with routes and interchanges for daily movement to work, retail and leisure activities, and including easy access to wider routes for active travel such as NCR 6 on Liverpool Road and attractive routes along the Bridgwater Canal and the River Irwell. The Proposed Development is supported by a Framework Travel Plan that aims to minimise the number of car trips and to encourage residents to use sustainable transport modes. Each residential unit is provided with cycle storage, and this will help facilitate more active travel. Overall, the location of the Site in an area with the highest score for accessibility to public transport, and with excellent varied access to pedestrian and cycle networks for employment, services, and facilities in the city centre, will encourage active travel with likely major positive effects in the local area that may be synergistic and cumulative in the longer-term.

Healthy Environment:

10.83. The Site is a previously developed brownfield site but the risk of pollution from previously contaminated land and any associated risk to human health is considered to not be significant and it has not been necessary to investigate this technical topic any further in this ES. The Site is within Flood Zone 1 with a low probability of flooding and therefore, there is no risk to human health and well-being. During construction, potential risks to health for workers and nearby residents from dust and particulates are controlled through the implementation of a Construction Environmental Management Plan (CEMP) such that residual effects on human health are Negligible. Air quality effects on the future residents from NO_2 and PM_{10} emissions are Negligible. Potential adverse noise effects are minimised through solid screening of the Site,

communication and the CEMP to Negligible. During operation, pollution from vehicle exhausts was found to be negligible. Noise is reduced to Negligible through adherence to environmental noise limits for building services plant and for amenity spaces.

10.84. There is a risk to human health and safety from the glare of solar dazzle that can occur when sunlight is reflected from a glazed façade. This could affect road and rail/tram drivers and users of adjacent buildings. The assessment considered a worst-case scenario and found that overall effects from solar glare on road users and tram drivers is Minor Adverse and this is Not Significant. It is also noted that as other developments are constructed nearby, they could obscure some viewpoints and reduce solar glare in the longer term.

10.85. Lack of daylight/sunlight and overshadowing can adversely affect health and well-being. In a city centre area, there is an expectation for a higher density of development and a lower sensitivity to such issues depending upon the context of the development and its surroundings. The regeneration of the Great Jackson Street area accepts that the height and density of buildings will increase at such a key gateway to the city centre. However, an increased quantum and quality of public space will also be implemented. The studies investigated the surrounding residential buildings for daylight/sunlight and two nearby amenity areas for overshadowing and identified that effects would not be significant within the context of a regeneration area in the city centre, and thus not significant with regard to a healthy environment.

10.86. The wind microclimate for pedestrian comfort and safety in thoroughfares and entrances for the site and surrounding buildings were found to be Not Significant, indicating that the wind environment is suitable for the intended uses. Over the 60-year life of the buildings, there will be moderate adverse effects on climate with potential associated risks for human health with more extreme weather conditions. Mitigation measures, particularly the transition to sustainable transport, should limit such effects in the longer term and contribute to a healthier environment.

10.87. Replacement tree planting is proposed on a 10:1 basis (6 trees lost, replaced by 63 trees) to ensure that there is a net increase in tree cover post development. Urban trees contribute to a healthy environment through shading, helping mitigate air and noise pollution, helping to mitigate effects of climate change, and enhancing health and well-being through provision of natural areas for recreation, amenity, and aesthetic benefits.

Vibrant Neighbourhoods:

10.88. The vision of the regeneration area is to '*create a vibrant, safe, secure and sustainable community*'[63] and the delivery of the good-quality housing on the Site will contribute to the neighbourhoods developing around as other developments are completed. The proposals include 0.5ha of new public realm that separates the building form and provides important pedestrian connectivity to within the Framework Area and adjacent areas – all will contribute to Vibrant Neighbourhoods.

10.89. Provision of and access to employment is known to have a positive effect on health and wellbeing – the Proposed Development will have minor beneficial impacts on local expenditure, supporting new jobs, and also on local authority income. The additional employment created and positive effects on the local economy will further contribute to Vibrant Neighbourhoods. The change from a site with construction cabins and car parking to a lived-in and securely managed residential area will contribute to a reduction in crime and an improvement in

[63] Great Jackson Street Development Framework (2018)

community safety. Overall, the Proposed Development is likely to have **Moderate Beneficial** effects on the vibrancy of neighbourhoods.

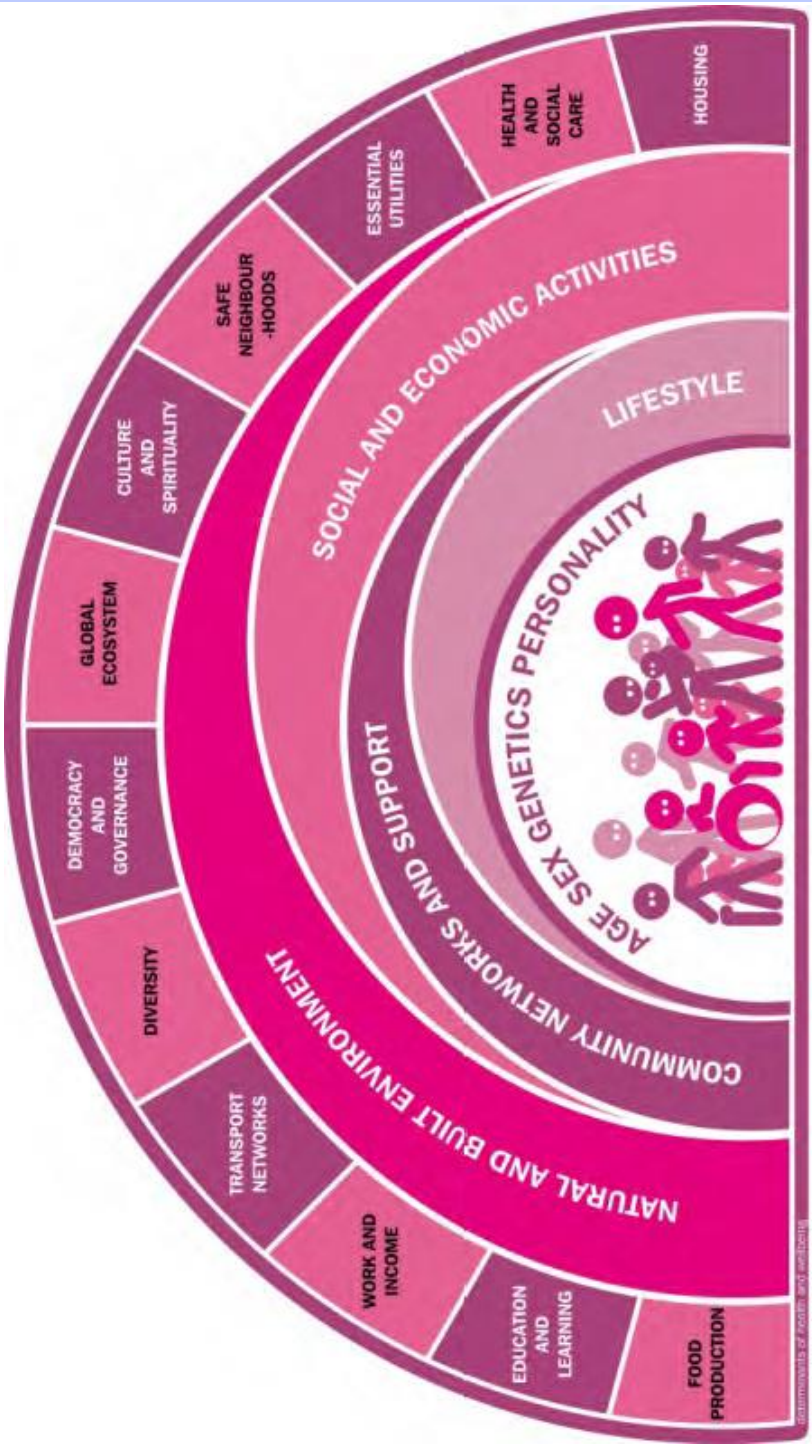


Figure:	10.1		
Title:	The Determinants of Health and Wellbeing		
Project:	Great Jackson Street Plot F		
Date:	15/10/2021	Scale:	N/A

11. Solar Glare

Introduction

11.1. This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to Solar Glare. 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 negative effects; and the likely residual effects after these measures have been adopted.

11.2. This Chapter is accompanied by one technical appendix, Solar Glare Assessments (Appendix 11.1), and the following figures:

- Figure 11.1 – Typical Stopping Distances for a car;
- Figure 11.2 – Field of Vision Diagram;
- Figure 11.3 – Viewpoints assessed for solar glare assessment; and
- Figure 11.4 – Elevations referenced within the assessment.

11.3. This Chapter has been prepared by Krystle Stewart of GIA. GIA is an independent firm of chartered surveyors and technical specialists, regulated by RICS and with over 150 members of staff is the largest specialist advisor in the UK. GIA have extensive experience in providing expert advice on daylight, sunlight, overshadowing, solar glare and light pollution. Krystle Stewart is a graduate of Victoria University of Wellington, NZ with a Masters in Building Science, she has over 5 years of UK experience in the technical assessments, consultancy and EIA works in relation to solar glare.

Legislative and Policy Context

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

Other Relevant Policy, Standards and Guidance

Commission Internationale de L'Eclairage (CIE) 146:2002 & CIE 147:2002 Collection on glare (2002)[64]

11.5. 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."*

[64] 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 (2011)[65]

11.6. 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

11.7. The solar glare assessment is undertaken in 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.

11.8. However, it should be noted that the Proposed Development will be located on a Site where its existing state is a construction compound thus there is limited opportunity for instances of solar glare from the Site to be experienced. Solar glare from surrounding buildings is not assessed.

Scenarios Assessed

11.9. A qualitative assessment has been undertaken for the following scenarios, based on the worst-case scenario being the completed development (Scenario 4):

- Construction and Demolition; and
- Scenario 2 (Interim Development Scenario): Phase A, including Phase A basement MSCP, highways, and part of the public realm.

11.10. The following scenario has been technically assessed and is reported on in detail within this chapter of the ES:

- Scenario 4 (Proposed Development Scenario): Phases A & B, including basement MSCP (for both towers), highways, and public realm.

11.11. The solar glare effects of neighbouring schemes are expected to be assessed in isolation and reported in absolute terms as part of their application. Cumulative solar glare effects do not portray a worst-case scenario as the inclusion of neighbouring scheme may block sunlight from reaching the facades of the Proposed Development or obstruct the Proposed Development from viewpoints assessed. Solar glare effects are therefore assessed in isolation to portray the worst-case scenario and reported in absolute terms only.

Proposed Development Scenario

11.12. Scenario 4 comprises the Proposed Development including Plots F1 and F2 fully implemented. This scenario consists of the Proposed Development in the context of the surrounding existing environment and committed developments that have commenced on site. The following

[65] Building Research Establishment (BRE), Site Layout Planning for Daylight and Sunlight: A guide to good practice, Second Edition, BRE, 2011

committed developments have been included within the surrounding existing environment:

- 1) 2-4 Chester Road;
- 2) Deansgate Square;
- 3) Crown Street Phase 1 (Elizabeth Tower and Victoria Residence);
- 4) Crown Street Phase 2 (excluding the School); and
- 5) Viadux.

Methodology for Determining Sensitive Receptors

11.13. 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.

11.14. At each of the identified junctions, 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.

11.15. 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. The viewpoints assessed are indicated in Figure 11.3.

Methodology for Determining Demolition and Construction Effects

11.16. 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.

11.17. 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

11.18. 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.

11.19. 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 that 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.

11.20. 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°.

11.21. Figure 11.2 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.

11.22. 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.

11.23. 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

11.24. 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.

11.25. Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:

$$D_{total} = D_{thinking} + D_{braking} = V*T + V^2/(2\mu*g)$$

11.26. 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.

11.27. The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. Figure 11.1 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.

11.28. 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.

Viewpoints for Train Drivers

11.29. In the case of a train driver, the view direction is defined by the rail tracks. The Railway Group Standard GE/RT8037 Signal Positioning and Visibility[66] sets the eye level of the driver at 2.75 m above the rails. The viewpoint is centred between the tracks for ease of reference. Although train drivers sit slightly to the left within the cabin, this bears no material effect on the analysis of the images as the signals are visible at a distance of hundreds of metres at which point the slight shift in the cabin equates to a very small angular change.

11.30. The assessment also considers a train drivers 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

11.31. 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.

11.32. 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.

11.33. 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.

11.34. Initially, the following guide is used to ascertain the possible magnitude of impact for each view and the factors listed below are then be taken into consideration to determine the overall magnitude of impact for the designated viewpoint.

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.

[66] Rail Group Standard, GE/RT8037 Signal Positioning and Visibility, Rail Safety and Standards Board, 2003

Significance Guidance	Possible Factors
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.	

11.35. Multiple viewpoints at any one junction may be chosen for each of the traffic lanes or signals affected. In terms of significance criteria however, professional judgement has been used to determine the effect at the location rather than the individual perspectives at a signal traffic junction. Factors that could influence the significance of effect may include:

- sunlight availability probability;
- area of façade off which reflections are visible;
- 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.

11.36. 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 a proposed development. Therefore, the assessment considers the effect of the Proposed Development in absolute terms, by reference to the above criteria.

11.37. Effects in terms of solar glare can only be adverse (negative) in nature due to this not being a comparative assessment.

11.38. Generally, all road junctions where signal sightings are necessary are considered high sensitivity. Where viewpoints have been assessed at non-controlled junctions where drivers do not have fixed viewpoint or along a roadway where drivers are not required to make any specific manoeuvres, they are considered moderate sensitivity. Likewise, for train drivers, where signals are visible, the stretch of track is considered high sensitivity but where there are no signals visible, the viewpoints are considered moderate sensitivity.

11.39. Following the magnitude of an effect and sensitivity, using this methodology a clear statement is then made as to whether the 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.

Limitations and Assumptions

11.40. 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.

11.41. It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

11.42. The material finish of the proposed aluminium panels is not yet known, therefore a worst-case assumption has been made that a reflective coating will be applied to the proposed aluminium panels. If the final coating applied is a matte finish, or similar non-reflective coating, then the effects reported would be significantly less as the reflections would be smaller and broken up.

Identification and Evaluation of Significant Effects

Construction & Demolition

11.43. 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.

11.44. 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.

11.45. As such, the overall effect in terms of solar glare would range from being negligible effects during demolition, then gradually changing from negligible to **permanent, minor adverse and not significant**, once the Proposed Development is complete, as set out in the assessment of the Proposed Development scenario below.

Interim Development Scenario (Scenario 2)

11.46. This scenario considers the Proposed Development comprising Phase A (F2), including Phase A basement MSCP, highways, and part of the public realm, in the scenario that Phase B has not yet commenced on Site.

11.47. As the Proposed Development is a phased application, there is the potential that changes in the intended construction programme may occur and Phase A could be completed but Phase B works may not have commenced on site. 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 4, except where the effects result from Phase B (F1) only. As such, the completed Proposed Development is considered the worst-case scenario and the effects would be as per those reported for Scenario 4, except at the following junctions where only Phase B

(F1) is visible and the effects in Scenario 2 would therefore be negligible:

- Deansgate Junction 1 (DG1);
- Mancunian Way/Ring Road Westbound (MW1 and MW2); and
- Medlock Street Junction Slip-road (MS2).

11.48. Therefore, the effects in terms of solar glare would range from **temporary, negligible effects to permanent, minor adverse effects** and not significant.

Proposed Development (Scenario 4)

11.49. The full solar glare assessment is provided in Technical Appendix 11.1

11.50. The assessment has been undertaken from the sensitive viewpoints on roads and rail track surrounding the Site where the Proposed Development is visible with a summary of results provided below. The summary tables below outline the times of day and year that reflections would be visible from each of the relevant facades, Figure 11.4 identifies the elevations as referenced within the assessment tables. The main facades comprise vertical panels whilst the corner facades comprise alternating panels angled slightly upward and downward spanning

11.51. 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; and
- The proposed anodised aluminium panels have been considered as reflective due to the proposed finish having not yet been determined. As such, it is probable that these panels may not be reflective and would break up the reflections visible significantly, as such, the reflections are likely to be less than those reported once the anodised aluminium panel finish is determined.

Deansgate Junction 1 (DG1) – Junction with Whitworth Street West

11.52. Two viewpoints have been assessed at this junction, DG1a and DG1b. Viewpoint DG1a shows the view of drivers in the left lane looking at the traffic lights, whilst viewpoint DG1b shows drivers in the right lane looking at the traffic lights. There is a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

Table 11.2 – Summary of Potential Reflections at Deansgate Junction 1 (DG1)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
DG1a	F1: North-Western	14:00 to 15:00 GMT	Mid-September to late-November and early-January to mid-March	A small slither spanning 7° to 20° from the driver's direct line of sight.	Minor Adverse
	F1: Northerly corner	19:00 GMT until sunset	Mid-May to mid-July	A small area between 7° and 8° from the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
DG1b	F1: North-Western	14:00 to 15:00 GMT	Mid-September to mid-November and mid-January to mid-March	A small slither spanning 14° to 25° from the driver's direct line of sight.	Minor Adverse
	F1: Northerly corner	19:00 GMT until sunset	Mid-May to mid-July	A small area between 13° and 14° from the driver's direct line of sight.	Minor Adverse

11.53. At this junction, for both viewpoints assessed:

- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed;
- The potential reflections only occur for small areas within the driver's field of view; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.54. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of Deansgate with Whitworth Street West is of high sensitivity and the overall effect in terms of solar glare is considered to be permanent, Minor Adverse and not significant.

Deansgate Junction 2 (DG2) – Junction with Great Bridgwater Street

11.55. Two viewpoints have been assessed at this junction, DG2a and DG2b. Viewpoint DG2a shows the view of drivers in the left lane looking at the traffic lights, whilst viewpoint DG2b shows drivers in the right lane looking at the traffic lights. There is a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

Table 11.3 – Summary of Potential Reflections at Deansgate Junction 2 (DG2)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
DG2a	F1: North-Western	14:00 to 15:00 GMT	Mid-October to mid-November and mid-January to mid-February	A small area of reflection is visible between 9° to 12° from the driver's direct line of sight.	Minor Adverse
DG2b	F1: North-Western	14:00 to 15:00 GMT	Mid-October to mid-February	A small slither spanning 14° to 25° from the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
	F2: Northerly corner	09:00 to 10:00 GMT	Mid-September to mid-November and mid-January to mid-March	A very small area of reflection is visible between 11° to 14° from the driver's direct line of sight.	Minor Adverse

11.56. At this junction, for both viewpoints assessed:

- The majority of potential reflections occur above the driver's visor line, which would mitigate the majority of effects when deployed;
- The potential reflections only occur for small areas within the driver's field of view; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.57. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of Deansgate with Great Bridgewater Street is of high sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Lower Mosley Street (LM) – Junction with Great Bridgewater Street

11.58. Two viewpoints have been assessed at this junction, LMa and LMb. There is just one lane of traffic, viewpoint LMa shows the view of drivers looking at the left-hand traffic lights, whilst viewpoint LMb shows drivers in the right-hand traffic lights. There is a third traffic light on the opposite side of the junction primarily for use by stationary vehicles.

Table 11.4 – Summary of Potential Reflections at Lower Mosley Street (LM)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
LMa	F2: Northerly Corner	06:00 to 07:00 GMT from down-angled panels and 07:00 to 08:00 GMT from up-angled panels	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small slither of reflection is visible between 10° to 16° from the driver's direct line of sight.	Minor Adverse
	F2: North-Eastern	12:00 to 14:00 GMT	Mid-October to mid-February	A small slither of reflection is visible between 12° to 16° from the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
LMb	F2: Northerly Corner	06:00 to 07:00 GMT from down-angled panels and 07:00 to 08:00 GMT from up-angled panels	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small slither of reflection is visible between 25° to 27° from the driver's direct line of sight.	Minor Adverse
	F2: North-Eastern	12:00 to 14:00 GMT	Mid-October to mid-February	A small area of reflection is visible between 26° to 27° from the driver's direct line of sight.	Minor Adverse

11.59. At this junction, for both viewpoints assessed:

- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed;
- The potential reflections only occur for small areas within the driver's field of view; and
- Once the anodised aluminium panels materiality is known, it islikely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.60. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of Lower Mosely Street with Great Bridgewater Street is of high sensitivity and the overall effect in terms of solar glare is considered to be permanent, Minor Adverse and not significant.

Albion Street (AS) – Junction with Whitworth Street West

11.61. Three viewpoints have been assessed at this junction, ASa, ASb and ASc. Viewpoint ASa shows the view of drivers in the left lane looking at the traffic lights on the opposite side of the junction, viewpoint ASb shows drivers in the right-hand traffic lights, with ASc showing the viewpoint from a third traffic light on the opposite side of the junction primarily for use by stationary vehicles.

Table 11.5 – Summary of Potential Reflections at Albion Street (AS)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
ASa	F2: Northerly Corner	07:00 to 08:00 GMT	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small slither of reflection is visible between 13° to 23° from the driver's direct line of sight.	Minor Adverse
	F2: North-Eastern	13:00 to 14:00 GMT	Mid-October to mid-February	A small slither of reflection is visible between 13° to 23° from the driver's direct line of sight.	Minor Adverse
ASb	F2: Northerly Corner	07:00 to 08:00 GMT	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small slither of reflection is visible between 14° to 23° from the driver's direct line of sight.	Minor Adverse
	F2: North-Eastern	13:00 to 14:00 GMT	Mid-October to mid-February	A small area of reflection is visible between 14° to 23° from the driver's direct line of sight.	Minor Adverse
ASc	F2: Northerly Corner	07:00 to 08:00 GMT	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small slither of reflection is visible between 11° to 20° from the driver's direct line of sight.	Minor Adverse
	F2: North-Eastern	13:00 to 14:00 GMT	Mid-October to mid-February	A small area of reflection is visible between 11° to 20° from the driver's direct line of sight.	Minor Adverse

11.62. At this junction, for both viewpoints assessed:

- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed;

- The potential reflections only occur for small areas within the driver's field of view; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.63. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of Albion Street with Whitworth Street West is of high sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

River Street (RS) – Junction with Medlock Street

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

Table 11.6 – Summary of Potential Reflections at River Street (RS)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
RS	F2: South-Eastern	09:00 to 11:00 GMT	Mid-January to mid-March and mid-September to mid-November.	Reflections are visible from 19° of the driver's direct line of sight.	Minor Adverse

11.65. At this junction, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.66. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of River Street with Medlock Street is of moderate sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Garwood Street (GS) – Junction with Great Jackson Street

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

Table 11.7 – Summary of Potential Reflections at Garwood Street (GS)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
GS	F2: South-Eastern	06:00 to 08:00 GMT	Mid-March to mid-September.	Reflections are visible from 11° of the driver's direct line of sight.	Minor Adverse

11.68. At this junction, for the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.69. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the junction of Garwood Street with Great Jackson Street is of moderate sensitivity and the overall effect in terms of solar glare is considered to be permanent, Minor Adverse and not significant.

Melbourne Street (MS) – Junction with Great Jackson Street

11.70. One viewpoint has been assessed at this junction, MS. There is just one lane of traffic, and this is not a controlled junction, therefore the viewpoint assessed (MS) shows the view of drivers look forward as they approach the junction. No reflections are visible from the Proposed Development within 30° of a driver's direct line of sight, therefore the junction of Melbourne Street with Great Jackson Street is of moderate sensitivity and the overall effect in terms of solar glare is considered to be Negligible and not significant.

Deansgate Interchange (DGI) – Slip-road joining Mancunian Way/Ring Road (Eastbound)

11.71. 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.

Table 11.8 – Summary of Potential Reflections at Deansgate Interchange Slip-road (DGI)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
DGI	F1: South-Western	09:00 to 11:00 GMT	Mid-October to mid-February.	Reflections are visible from 23° of the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
	F1: Westerly Corner	16:00 to 17:00 GMT	Mid-January to mid-March and mid-September to mid-November.	Reflections are visible from 28° of the driver's direct line of sight.	Minor Adverse
	F2: South-Western	09:00 to 10:00 GMT	Mid-September to mid-March.	Reflections are visible from 17° of the driver's direct line of sight.	Minor Adverse
	F2: Westerly Corner	15:00 to 16:00 GMT from down-angled panels and 14:00 to 16:00 GMT from up-angled panels	Mid-October to mid-February for the down-angled panels. Mid-February to mid-April and mid-August to mid-October for the up-angled panels.	Reflections are visible from 21° of the driver's direct line of sight.	Minor Adverse

11.72. For the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Almost all potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.73. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, Deansgate Interchange Slip-road approaching Mancunian Way/Ring Road is of moderate sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Mancunian Way/Ring Road Eastbound (MW4-6)

11.74. Three viewpoints have been assessed as vehicles travel eastbound along Mancunian Way. There are two lanes of traffic, the viewpoints assessed are not junctions but have been assessed due to the sensitive nature of this motorway and its proximity to the Site. Each of the viewpoints (MW4, MW5 and MW6) show the view of drivers looking forward as they travel along this road. MW4 shows the view of drivers in the right lane after passing beneath the Deansgate Interchange overpass, MW5 shows the view of drivers in the left lane as they approach traffic merging from the Deansgate Interchange slip-road and MW6 shows the view of drivers in the centre lane as they approach the off-ramp to Medlock Street.

11.75. No reflections are visible from the Proposed Development within 30° of a driver's direct line of sight at viewpoints MW4 and MW6, these viewpoints therefore experience a **Negligible** effect in terms of solar glare.

Table 11.9 – Summary of Potential Reflections at Mancunian Way/Ring Road Eastbound (MW5)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
MW5	F2: South-Western	09:00 to 10:00 GMT	Mid-October to mid-February.	Reflections are visible from 24° of the driver's direct line of sight.	Minor Adverse
	F2: Westerly Corner	16:00 to 17:00 GMT from down-angled panels and 15:00 to 16:00 GMT from up-angled panels	Mid-October to mid-November and mid-January to mid-February for the down-angled panels. Early-March to mid-April and mid-August to late-September for the up-angled panels.	Reflections are visible from 28° of the driver's direct line of sight.	Minor Adverse

11.76. For the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.77. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, Mancunian Way/Ring Road Eastbound is of moderate sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Mancunian Way/Ring Road Westbound (MW1-3)

11.78. Three viewpoints have been assessed as vehicles travel westbound along Mancunian Way. There are two lanes of traffic, the viewpoints assessed are not junctions but have been assessed due to the sensitive nature of this motorway and its proximity to the Site. Each of the viewpoints (MW1, MW2 and MW3) show the view of drivers looking forward as the travel along this road. MW1 shows the view of drivers in the right lane after passing over the Medlock Street Junction, MW2 shows the view of drivers in the right lane as they approach traffic merging from the Medlock Street Junction slip-road and MW3 shows the view of drivers in the right lane as they approach the off-ramp to Deansgate Interchange.

11.79. No reflections are visible from the Proposed Development within 30° of a driver's direct line of sight at viewpoint MW3, this viewpoint therefore experiences a **Negligible** effect in terms of solar glare.

Table 11.10 – Summary of Potential Reflections at Mancunian Way/Ring Road Westbound (MW1 and MW2)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
MW1	F1: South-Eastern	07:00 to 09:00 GMT	Early-February to mid-March and mid-September to late-October.	A small slither spanning 10° to 21° from the driver's direct line of sight.	Minor Adverse
	F1: Southerly Corner	13:00 to 15:00 GMT from up-angled panels only	Mid-January to late-February and early-October to mid-November for the up-angled panels.	Small areas of reflections are visible between 10° to 20° from the driver's direct line of sight.	Minor Adverse
MW2	F1: Southerly Corner	12:00 to 13:00 GMT	Mid-January to mid-February and mid-October to mid-November.	A small area of reflection is visible from 29° of the driver's direct line of sight.	Minor Adverse

11.80. For the viewpoints assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.81. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, Mancunian Way/Ring Road Westbound is of moderate sensitivity and the overall effect in terms of solar glare is considered to be permanent, Minor Adverse and not significant.

Medlock Street Junction Slip-road (MS2) – Joining with Mancunian Way/Ring Road

11.82. 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 looking forward as they approach the junction.

Table 11.11 – Summary of Potential Reflections at Medlock Street Junction Slip-road (MS2)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
MS2	F1: South-Eastern	07:00 to 08:00 GMT with a small area of inter-reflection from F2 at 14:00 to 15:00	Mid-March to mid-April and mid-August to mid-September. There is also a small area of inter-reflection from F2 during mid-February to mid-March, mid-September to mid-October, and mid-November to mid-January.	Reflections are visible from 23° of the driver's direct line of sight.	Minor Adverse
	F1: Southerly Corner	13:00 to 14:00 GMT	Mid-November to mid-January for the down-angled panels. mid-January to mid-March and mid-September to mid-November for the up-angled panels.	Reflections are visible from 21° of the driver's direct line of sight.	Minor Adverse

11.83. For the viewpoint assessed:

- There are no signals where visibility can be affected by reflections from the Proposed Development;
- Potential reflections occur above the driver's visor line, which would mitigate any effects when deployed; andOnce the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.84. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, Medlock Street Junction Slip-road approaching Mancunian Way/Ring Road is of moderate sensitivity and the overall effect in terms of solar glare is considered to be permanent, Minor Adverse and not significant.

Princess Road/Medlock Street Junction (PR1)

11.85. Two viewpoints have been assessed at this junction, PR1a and PR1b. Viewpoint PR1a shows the view of drivers on Medlock Street looking at the left traffic lights, additionally there are two traffic lights on the right. Viewpoint PR1b shows drivers in the left-lane of Princess Road looking at the first traffic lights on the left, there is a second traffic light on left, one of the right side and a fourth further on the right, most likely to be used by stationary vehicles. All views of traffic lights not assessed would not be affected by the Proposed Development.

Table 11.12 – Summary of Potential Reflections at Princess Road/Medlock Street (PR1)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
PR1a	F2: South-Eastern	06:00 to 07:00 GMT	Early-April to late-May and early-July to late-August.	Reflections are visible between 21° and 28° of the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
	F2: Southerly Corner	11:00 to 12:00 GMT for up-angled panels only.	Mid-September to mid-March for the up-angled panels only.	Small areas of reflection are visible between 23° and 28° of the driver's direct line of sight.	Minor Adverse
	F2: South-Western	17:00 to 18:00 GMT with inter-reflection from F1 at 09:00 to 10:00	Early-April to mid-May and mid-July to late-August. Inter-reflections from F1 would occur during mid-October to mid-February.	Reflections are visible between 23° and 30° of the driver's direct line of sight.	Minor Adverse
PR1b	F2: South-Eastern	05:00 to 07:00 GMT	Mid-March to mid-May and mid-July to mid-September.	Reflections are visible between 17° and 25° of the driver's direct line of sight.	Minor Adverse
	F2: Southerly Corner	11:00 to 12:00 GMT for up-angled panels only.	Mid-January to mid-February and mid-October to mid-November for the up-angled panels.	Small areas of reflection are visible between 21° and 25° of the driver's direct line of sight.	Minor Adverse
	F2: South-Western	17:00 to 18:00 GMT with inter-reflection from F1 at 09:00 to 10:00	Mid-March to late-April and early-August to mid-September. There is also a small area of inter-reflection from F1 during mid-October to mid-February.	Reflections are visible between 22° and 26° of the driver's direct line of sight.	Minor Adverse
	F1: South-Eastern	06:00 to 07:00 GMT with an area of inter-reflection from F2 at 08:00 to 09:00 and 15:00 to 16:00	Mid-March to mid-April and mid-August to mid-September. There is also an area of inter-reflection from F2 during mid-January to mid-March, mid-September to mid-November.	Reflections are visible from 27° of the driver's direct line of sight.	Minor Adverse

11.86. At this junction, for both viewpoints assessed:

- The majority of potential reflections occur above the driver's visor line, which would mitigate the majority of effects when deployed;
- There are alternative, unaffected traffic lights controlling this junction; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.87. Therefore, based on professional judgement, in consideration of the magnitude of potential

effects and the factors outlined above, the junction of Princess Road and Medlock Street is of high sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Medlock Street (PR2) – Junction with Slip-road

11.88. One viewpoint has been assessed at this junction, PR2. Viewpoint PR2 shows the view of drivers on Medlock Street looking at the left traffic lights. There is a second traffic light on right that would not be affected by the Proposed Development.

Table 11.13 – Summary of Potential Reflections at Medlock Street Junction with Slip-road (PR2)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
PR2	F2: South-Eastern	06:00 to 08:00 GMT	Mid-March to mid-May and mid-July to mid-September.	Reflections are visible between 6° and 25° of the driver's direct line of sight.	Moderate Adverse
	F2: Southerly Corner	12:00 to 13:00 GMT for up-angled panels only.	Mid-September to mid-March for the up-angled panels only.	Small areas of reflection are visible between 12° and 25° of the driver's direct line of sight.	Minor Adverse
	F2: South-Western	17:00 to 18:00 GMT with an area of inter-reflection from F1 at 08:00 to 09:00	Mid-May to mid-July. Inter-reflections from F1 would occur during mid-January to mid-March and mid-September to mid-November.	Reflections are visible between 11° and 22° of the driver's direct line of sight.	Minor Adverse
	F1: South-Eastern	07:00 to 08:00 GMT	Early-March to mid-April and mid-August to late-September.	Reflections are visible between 17° and 25° of the driver's direct line of sight.	Minor Adverse
	F1: Southerly Corner	13:00 to 14:00 GMT for up-angled panels only.	Mid-January to mid-March and mid-September to mid-November for the up-angled panels.	Small areas of reflection are visible between 20° and 25° of the driver's direct line of sight.	Minor Adverse

11.89. At this junction, for the viewpoint assessed:

- All potential reflections occur above the driver's visor line, which would mitigate the effects when deployed;

- The junction is on a bend, where reflections would only occur for a very short stretch of road at any one time;
- There are alternative, unaffected traffic lights controlling this junction; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.90. Whilst Moderate Adverse reflections have the potential to occur at viewpoint PR2, due to their location above the drivers visor cut-off and the junction being on bend, based on professional judgement, the junction of Princess Road and Medlock Street is of high sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

New Vine Street (NV) – Junction with Clarendon Street

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

Table 11.14 – Summary of Potential Reflections at New Vine Street (NV)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
NV	F2: South-Eastern	Sunrise to 06:00 GMT	Mid-April to mid-August.	Reflections are visible between 5° and 14° of the driver's direct line of sight.	Moderate Adverse
	F2: Southerly Corner	10:00 to 11:00 GMT for up-angled panels only.	Mid-January to mid-March and mid-September to mid-November for the up-angled panels only.	Small areas of reflection are visible between 8° and 24° of the driver's direct line of sight.	Minor Adverse
	F2: South-Western	16:00 to 17:00 GMT	Mid-February to mid-April and mid-August to mid-October.	Reflections are visible between 10° and 25° of the driver's direct line of sight.	Minor Adverse
	F1: South-Eastern	06:00 to 07:00 GMT with an area of inter-reflection from F2 at 15:00 to 16:00	Mid-April to mid-May and mid-July to mid-August. Inter-reflections from F1 would occur during mid-February to mid-March and mid-September to mid-October.	Reflections are visible between 24° and 27° of the driver's direct line of sight.	Minor Adverse
	F1: Southerly Corner	11:00 to 12:00 GMT for up-angled panels only.	Mid-January to mid-February and mid-October to mid-November for the up-angled panels only.	Small areas of reflection are visible between 24° and 27° of the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
	F1: South-Western	17:00 to 18:00 GMT	Early-April to mid-May and mid-July to late-August.	Reflections are visible between 25° and 28° of the driver's direct line of sight.	Minor Adverse

11.92. 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 most effects when deployed;
- There are a number of trees that would obscure reflections that occur below the visor line;
- The reflections closest to the directly line of sight occur in the very early mornings when the probability of the sun shining is 30%; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.93. Whilst Moderate Adverse reflections have the potential to occur at viewpoint NV, due to their location predominantly above the drivers visor cut-off, the time of day when the reflections would occur, the presence of trees and the junction not being controlled by traffic light, the junction of New Vine Street with Clarendon Street is of moderate sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Tram Line (TRAM) – Travelling Westbound toward Deansgate-Castlefield Station

11.94. One viewpoint has been assessed for this tram line, TRAM. The viewpoint assessed (TRAM) shows the view of tram drivers look forward as they approach the station. Whilst no signals have been found from aerial imagery, it is expected that given the close proximity to the station, that there would be signals within this stretch of track.

Table 11.15 – Summary of Potential Reflections on Tram Line approaching Deansgate-Castlefield Station (TRAM)

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
TRAM	F2: Northerly Corner	06:00 to 08:00 GMT for the down-angled panels. 07:00 to 08:00 for the up-angled panels.	Mid-February to mid-March and mid-September to mid-October for the down-angled panels. Mid-March to mid-April and mid-August to mid-September for the up-angled panels.	A small area of reflections is visible between 25° to 28° from the driver's direct line of sight.	Minor Adverse

Viewpoint	Facade	Times of the Day that reflections occur	Times of the Year that reflections occur	Location within 30° of driver's line of sight	Magnitude of Effect
	F2: North-Eastern	13:00 to 14:00 GMT	Mid-October to mid-February	A small slither of reflection is visible between 26° to 29° from the driver's direct line of sight.	Minor Adverse

11.95. For the viewpoint assessed:

- The majority of potential reflections occur above the driver's visor line, which would mitigate most effects when deployed; and
- Once the anodised aluminium panels materiality is known, it is likely the reflections would be further broken-up thereby reducing the duration of potential reflections and the likelihood of the full sun disc being reflected.

11.96. Therefore, based on professional judgement, in consideration of the magnitude of potential effects and the factors outlined above, the view of tram drivers approaching Deansgate-Castlefield Station is of high sensitivity and the overall effect in terms of solar glare is considered to be **permanent, Minor Adverse** and **not significant**.

Mitigation Measures

11.97. There are no significant effects in terms of solar glare, therefore, no mitigation is considered necessary.

Cumulative Effects

11.98. Cumulative schemes are not assessed as the solar glare assessment is a worst-case scenario. Additional developments could obscure the view of the Proposed Development from certain viewpoints and therefore reduce instances of solar reflections.

Residual Effects

11.99. The likely significant effects of solar glare from the Proposed Development described above are considered a worst-case scenario. All solar glare effects to are considered moderate to high sensitivity depending on the 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 11.16 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Negligible to Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	None	Negligible to Minor adverse and not significant effects on Solar Glare
Negligible to Minor adverse and not significant effects on Solar Glare	Tram drivers on nearby tracks	None	Negligible to Minor adverse and not significant effects on Solar Glare

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Operational Phase			
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	Embedded in the design	Minor adverse and not significant effects on Solar Glare
Minor adverse and not significant effects on Solar Glare	Tram drivers on nearby tracks	Embedded in the design	Minor adverse and not significant effects on Solar Glare

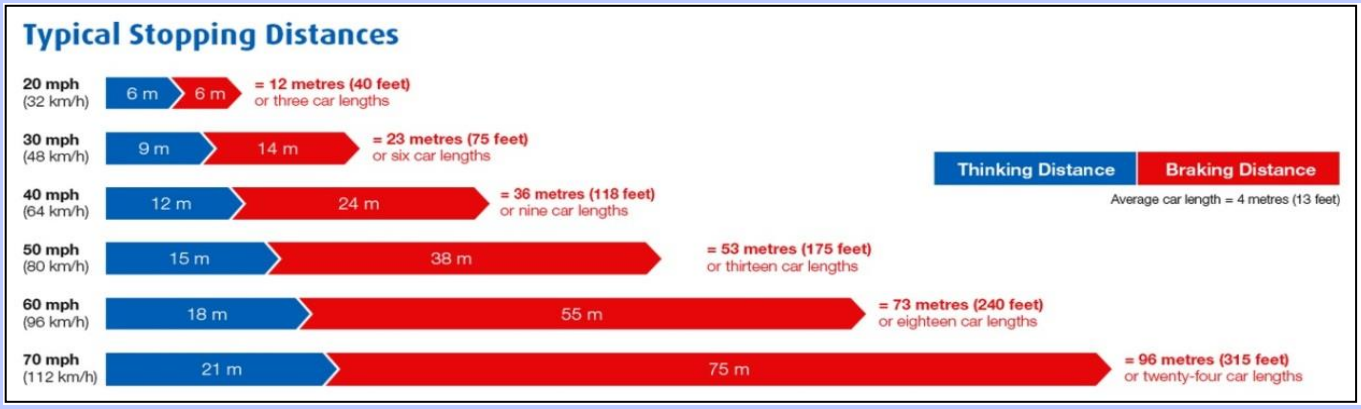


	Figure:	11.1		
	Title:	Typical Stopping Distances for a car		
	Project:	Great Jackson Street Plot F		
	Date:	05/07/2021	Scale:	N/A

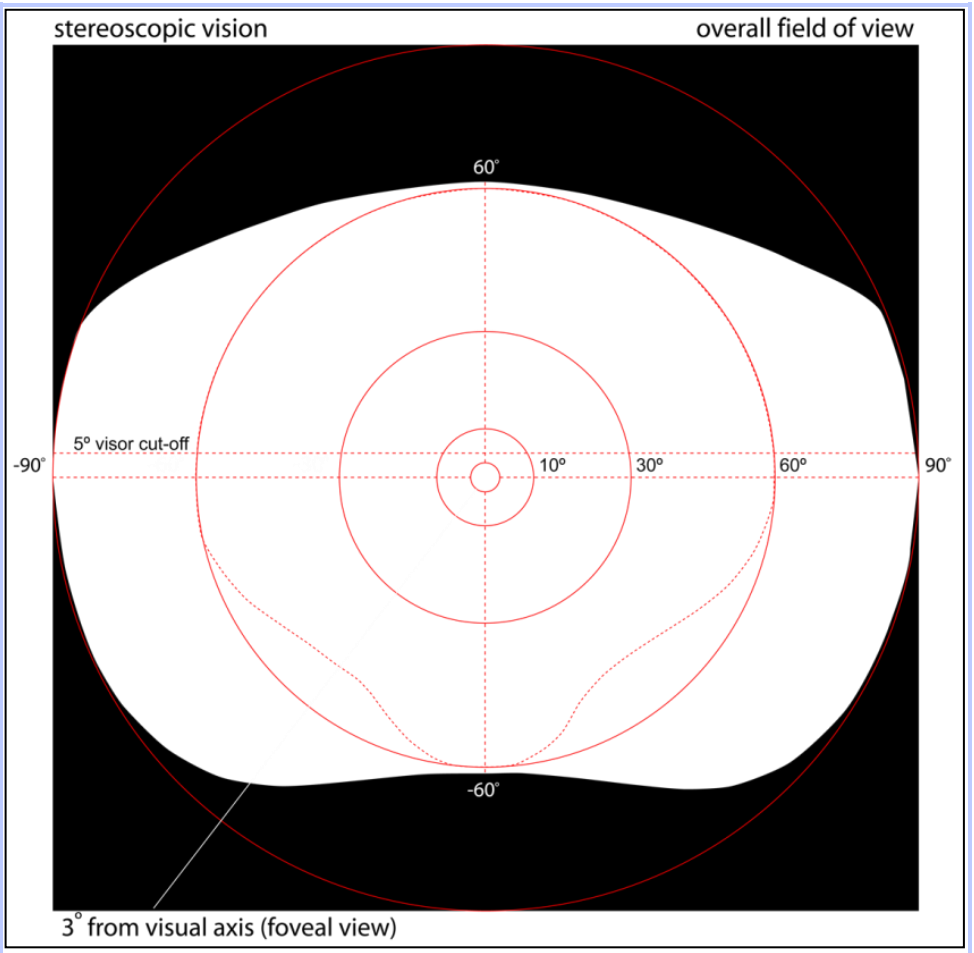


Figure:	11.2		
Title:	Field of Vision Diagram		
Project:	Great Jackson Street Plot F		
Date:	05/07/2021	Scale:	N/A

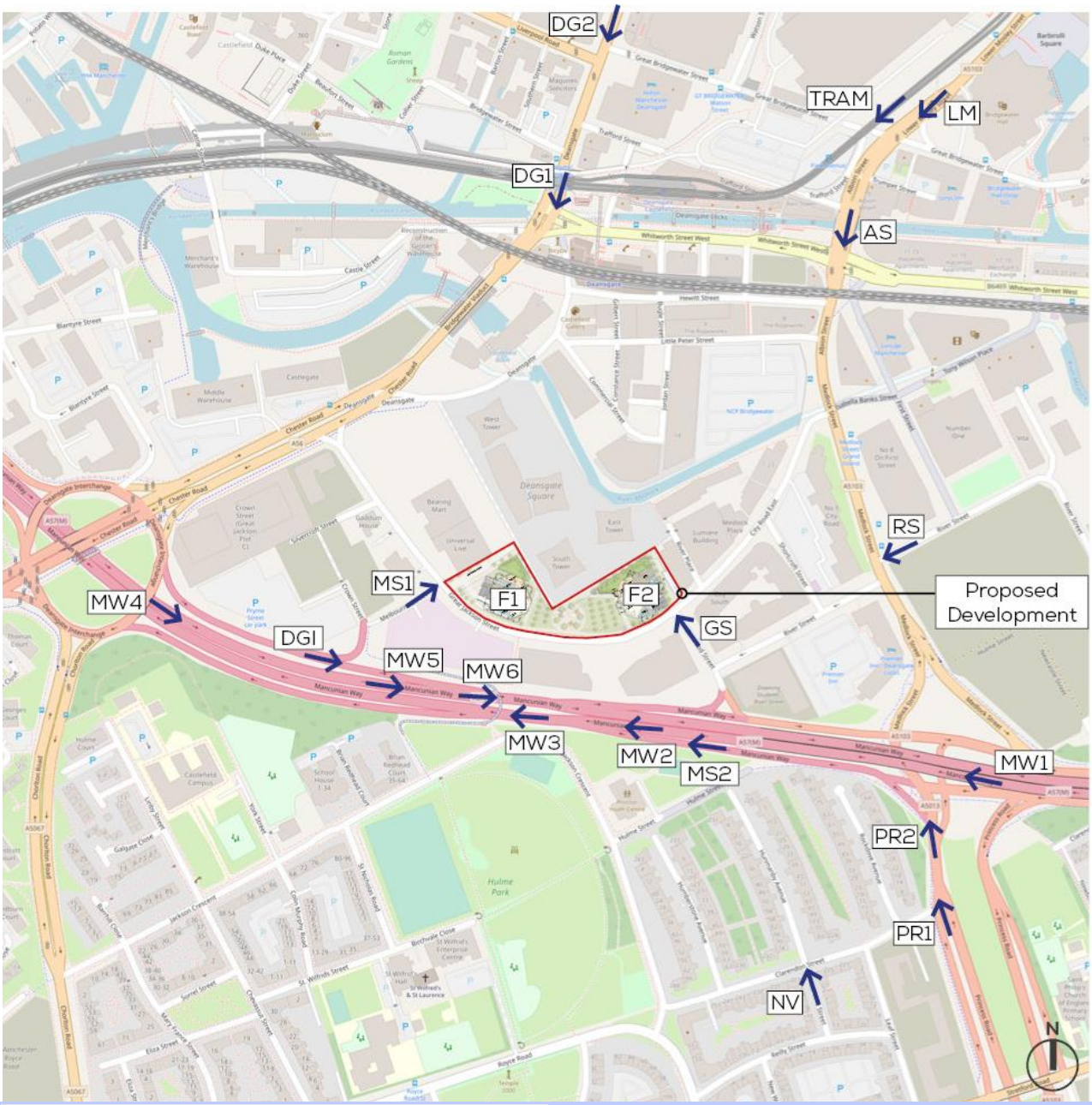


Figure:	11.3		
Title:	Viewpoints assessed for solar glare assessment		
Project:	Great Jackson Street Plot F		
Date:	05/07/2021	Scale:	N/A

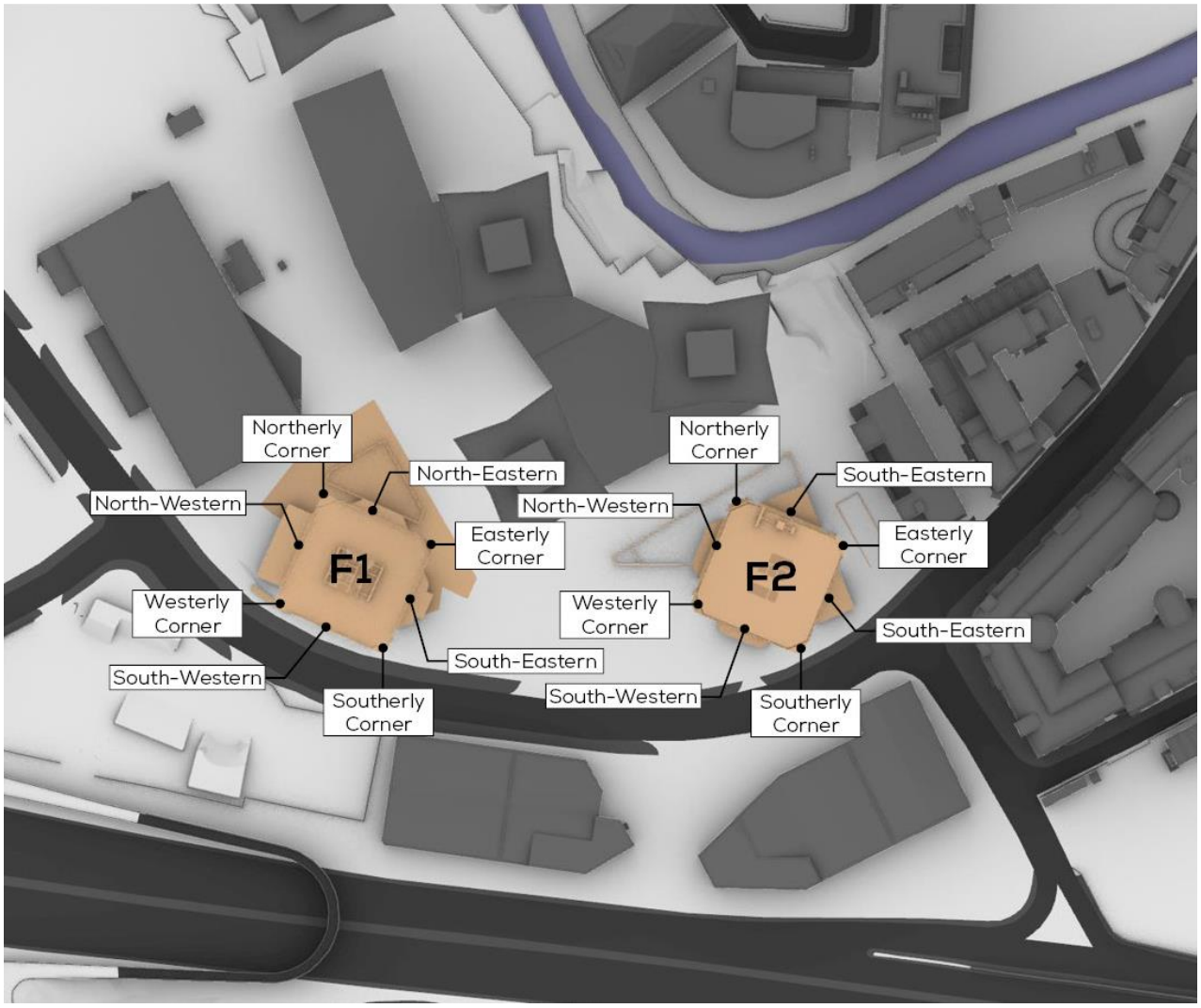


Figure:	11.4		
Title:	Elevations referenced within the assessment		
Project:	Great Jackson Street Plot F		
Date:	05/07/2021	Scale:	N/A

12. Townscape and Visual Impact

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 character and visual amenity. The Townscape and Visual Impact Assessment (TVIA) describes the methods used to assess the effects; the baseline conditions at the Proposed Development Site and surrounding area; mitigation measures, 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 and block images.
- Appendix 12.3: Visualization 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 23 tall buildings all of which have received planning consent, in Manchester and Salford including Beetham Hilton, Owen Street (Deansgate Square) and New Wakefield Street and others UK wide in Brighton, London, Leicester, Reading and Liverpool.

Legislative and Policy Context

Legislation

12.3. The European Landscape Convention (ELC, 2000)[67] 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.

12.4. 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 organize European co-operation on landscape issues.

National Planning Policy

12.5. The National Planning Policy Framework[68] sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements

[67] Ref 8.1 The European Landscape Convention (ELC 2000)
[68] Ref 8.2 National Planning Policy Framework 2021 Dept Communities and Local Government

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.

12.6. Key aspects of the NPPF, revised in 2021, which apply to the Townscape and Heritage 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);

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

12.7. The following relevant policies are set out below as extracts from Manchester City Council's Core Strategy[69]:

"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 vision.

Relevant Policies include:

[69] Manchester City Council Core Strategy 2012

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."

12.8. 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"

12.9. 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."

Great Jackson Street Development Framework

12.10. The Great Jackson Street Development Framework was prepared to guide the future comprehensive regeneration of the Great Jackson Street area of Manchester City Centre in 2007[70]. It was updated 2015 and 2018 and endorsed by Manchester City Council, following a further design review of the proposed masterplan. In relation to Tall Buildings Section 3 of the Development Framework guidance is summarised as follows:

'Building on the success of Owen Street, create a series of robustly tested tall buildings located around the perimeter of the site, in line with the agreed locations in the 2015 Framework. This would provide a strong visual profile and a dynamic marker from key viewing corridors including main City Centre approaches from the south.'

Assessment Methodology and Significance Criteria

12.11. This section of the ES chapter describes the study area, how baseline information has been gathered, and the method of assessing the significance of effects.

Study Area

12.12. The study area for this assessment comprises an area of approximately 1km in radius focussed on the Proposed Development Site which is an appropriate area in these circumstances. It includes Manchester City Centre and areas to the south of the A57 (M) Mancunian Way such as St Wilfrid's Park.

Baseline Surveys

Desk Based Research

12.13. 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

12.14. Field surveys were undertaken to explore the current baseline of Manchester City Centre Townscape Character Zones, confirm the ZTV and establish a series of Representative Viewpoints for assessment including those that are subject to Accurate Visual Representation (AVR).

Consultations

12.15. MCC were consulted on the initial selection of viewpoints and agreed their scope in June 2021 as part of the EIA Scoping Exercise.

[70] Great Jackson Street Development Framework 2018 Update , Deloitte Real Estate

Method of Assessing Significance

12.16. 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.[71]

"*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."*

12.17. 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 Fig 12.2, which is located at Appendix 12.1.

- 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.

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

- Guidance on tall buildings published by Historic England: Advice Note 4[72]

- History in the View prepared for English Heritage by LUC in 2011

- Manchester Residential Quality Guidance [73]

12.19. 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.

[71] Ref 8.4 Guidelines for Landscape and Visual Impact Assessment 3rd Edition 2013 landscape Institute and Institute of Environmental Management and Assessment
[72] Ref 8.5 Historic England note on Tall Buildings 2015
[73] Ref 6.6 Manchester Residential Quality Guidance MCC 2017

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

12.20. The assessment of the Proposed Development on Townscape Character has been based on Manchester City Centre Strategic Character Areas and City Centre Zones. (See Fig 2.1 in MCC Core Strategy). 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 zones which could be potentially affected by the Proposed Development include those that surround the Proposed Development:

Manchester City Centre Character Zones

Petersfield

Civic Quarter

First Street

Castlefield

Water Street

Hulme

Manchester Corridor

12.21. Their extent is defined on Figure 12.2: Inner City Zones and Viewpoints (Appendix 12.1) and they are described in more detail in the corresponding baseline condition section.

12.22. 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

12.23. 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 Lidar DSM data combined with 10K base mapping to produce a Zone of Theoretical Visibility (ZTV) or Viewshed map, Figure 12.1 Appendix 12.1, and then confirmed as part of the field work exercise. It covers the area immediately surrounding the Proposed Development to a distance of approximately 0.5km with a focus on the city centre. The Proposed Development, with two 51 storey towers at 186.07 and 186.7 AOD in height will be far from universally visible as the neighbouring 4 tower Deansgate Square development and others, such as Crown Street and Axis, obscure many views from the city centre to the north. The ZTV does however, provide a quick guide as to the Proposed Development's visibility.

12.24. As with other Townscape and Visual Impact Assessments, and in accordance with guidance issued in GLVIA, the usual, and accepted, practice of selecting and assessing of a range of "Representative Viewpoints", all publicly accessible, has been adopted as being the most appropriate and practical method of assessing and understanding the visual impact of the Proposed Development from a range of viewpoints surrounding the Proposed Development Site. These viewpoint locations are marked in Appendix 12.1 on Figure 12.1 ZTV and viewpoints and Figure 12.2 Inner City Zones and Viewpoints and illustrated by way of baseline photographs and Accurate Visual Representation (AVR)s, or verified views, taken from these viewpoints which are represented in Appendix 12.2.

12.25. Viewpoints were selected to cover a number of different locations to reflect the experience of different types of visual receptor and viewing distance. Accordingly, viewpoints ranged from immediate proximity to the Proposed Development to surrounding neighbourhoods. Viewpoints included: streets, public parks, footpaths and main approach roads.

12.26. During the main field assessment process which occurred in May 2021, baseline viewpoint photographs were taken using a Canon EOS RP DSLR camera, but then subsequently retaken by Ambiente using a Canon 5DMkII FFS with a Canon 24 TS-E 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 which is based on LI Technical Advice note 06/19[74]. This ensures that the effect of the inclusion of a tall building in the view is properly assessed compared to if solely LVIA guidance was adhered to.

12.27. 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 Accurate Visual Representations (AVR) images.

Defining Significance of Effect

12.28. 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

12.29. 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

[74] Landscape Institute Technical Advice note 06/19 Visual Representation of Development Proposals

of the type of change or development proposed and the value attached to the townscape, as set out below.

12.30. 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, para 5.40). 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.

12.31. 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.

12.32. 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

12.33. 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 Proposed Development 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 Proposed Development 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 Proposed Development will result in a small change in the key characteristics of townscape character; will introduce elements that are not uncharacteristic to the attributes of the receiving townscape; and/or will result in a minor loss, alteration or addition of elements/features/characteristics.
Negligible adverse townscape effect	The Proposed Development will result in a just discernible change to townscape character/elements/features/characteristics.
Negligible townscape benefit	The Proposed Development will result in a just discernible improvement to the townscape character/elements/features/characteristics.
Minor townscape benefit	The Proposed Development 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 Proposed Development 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 Proposed Development 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 Proposed Development will not cause any change to the townscape character/ elements/ features/ characteristics.

12.34. 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.

12.35. 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

12.36. 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

12.37. The value attached to views has regard to a number of factors, including:

1. recognition through planning designations or heritage assets; and
2. the popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

12.38. 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.

12.39. 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.
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;

Susceptibility	Type of Receptor
	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

12.40. 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 Proposed Development 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 Proposed Development 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 Proposed Development 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 Proposed Development 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 Proposed Development will cause no change to the view.

12.41. 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

12.42. 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

12.43. 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	Negligible
	Medium	Moderate Significance	Moderate Significance	Minor Significance	Negligible	Negligible
	Low	Moderate Significance	Minor Significance	Negligible	Negligible	Negligible

12.44. The effects on both townscape and visual receptors is examined in each case where the effect of the Proposed Development, accurately modelled as a Type 4 AVR 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 Effect Significance Matrix in Table 12.7 and then a judgement made as to whether the effect is **significant** or **not significant** in EIA regulation terms.

12.45. 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 Manchester City Centre, 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 very short period in relative terms in the context of its lifecycle, 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 for the Proposed Development this has been derived 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 Inner City Zones and Representative Viewpoints that may be potentially affected by the Proposed Development as existing at the time of this assessment in 2021. Each character area is referenced on Fig 12.2: Inner City Zones and Viewpoints (**Appendix 12.1**). Only those areas which have the potential to be affected by the Proposed Development are included.

12.51. There is no doubt that Manchester is currently going through a major phase of new development with construction which affects most of the inner city character zones in some form or other. Some development, but not all, will have the capacity to alter the visual and townscape baseline more significantly than others. In terms of the baseline assessment the GLVIA advises that '*existing schemes and those under construction should be included in the baseline for both landscape* (townscape in this case) *and visual effects baseline* 'and that '*the baseline for assessing cumulative landscape (townscape) effects should include those schemes, and in addition potential schemes, that are not yet present in the landscape but are at various stages in the development and consenting process*.'.

12.52. For the purposes of this assessment therefore, the baseline conditions that prevail at the current time (2021) 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 of any remaining development, including the Proposed Development, either proposed or coming forward is dealt with in the Cumulative Effects section.

Civic Quarter

12.53. 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), the spire of which is one of Manchester's most prominent skyline features, and Albert Square, an important civic space which is now undergoing a period of refurbishment. Enclosed on all sides by buildings of similar scale and mass, trees have been introduced to soften the architecture and add to the ambience of St. Peter's Square. Other important historic civic buildings include the Central Library (Grade II* Listed) 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) on the other. 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. The St Peter's Square Conservation Area covers the central part of this zone and key elevated views down Oxford Street can be obtained from the southern corner of the square.

Representative Viewpoints: 12,13

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 storey), previously Manchester's highest building, but now eclipsed by the Deansgate Square development. New buildings, all of which affect the baseline and are approaching or have completed, include Elizabeth Tower and Axis developments.

Representative Viewpoints: 1,2,3,11, 14,15

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. New development is coming forward with 20 storey development overlooking the basin on Chester Road.

Representative Viewpoints: 6, 7 and 19

First Street

12.58. The raised railway viaduct and arches provide a strong horizontal feature along the northern boundary of this zone, obscuring ground level views to the north. It is punctuated by individual landmark features such as the chimney of Chorlton Mill, Dunlop and Mackintosh Mill buildings. Most of the buildings in this area are commercial or industrial and the overall visual quality is marred by unattractive spaces with low townscape value. However, a major regeneration scheme has lifted the townscape quality to the east markedly and provided Manchester with a new theatre and arts centre: Home.

Representative Viewpoint: 4

Water Street

12.59. 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 which is now coming forwards lies in this zone.

Representative viewpoints 16,17

Great Jackson Street

12.60. Situated between Oxford Road and Chester Road, this area has been and is the focus of considerable regeneration in recent years. Notably, tall buildings have become key components of the townscape character of this zone and include Deansgate Square, Crown Street Phase 1 and River Street. It is bounded by the inner ring road, the Mancunian Way, to the south and the River Medlock to the north.

Representative viewpoint 5

Corridor Manchester

12.61. 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 construction of the 32 storey tower on New Wakefield Street is now complete. 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 occasionally provides good views of the Proposed Development although the Circle Square is

having an ever increasing impact on both townscape character and views as multiple tall buildings emerge.

Representative viewpoints 9,10

Hulme

12.62. 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 8,18

Assessment of Effects

Limitations and Assumptions

12.63. The principal limitation as far as the field survey work was concerned has been that photography was undertaken in the summer months when the extent of foliage on trees is at the maximum This does not represent therefore, a worst case scenario but, as the population of street trees in Manchester is low this effect should only become apparent in a limited number of views. In addition the scale of the Proposed Development is such that it is likely to rise far above the canopy line in most cases.

Embedded Mitigation

12.64. 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.

Sources of Effect

Demolition and construction phases

12.65. The construction of the Proposed Development will occur in a number of phases as set out in Chapter 6 of this ES and set out below for completeness:

- **Phase 1 – Tower F2 and residents car park and part public realm**– construction estimated to take four years; commencing in April 2022 and completing in April 2026.
- **Phase 2 – Tower F1 and Residents car park, completion of Public Realm and creation of Melbourne Street** construction estimated to take four years; commencing in December 2023 and completing in December 2027.
- **Final public realm (for example, reinstating highway post construction and landscaping around the perimeter of the Site) and Section 278 Highways works** – completion targeted for December 2027

12.66. The construction phase for such a large-scale development on a site on the outskirts of Manchester City Centre will clearly involve procedures and processes that are unsightly and intrusive, as is the case 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.

12.67. The key physical activities will include:

- Site clearance.
- 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.
- Connection to existing services.

Assessment of Construction Phase Effects

12.68. The construction phase effects, 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 two Townscape Character Zones in and around the Proposed Development Site namely: Hulme and Corridor Manchester. The effects of such construction activity on the character of this zone in the immediate vicinity is predicted to be **moderate** to **minor adverse** for the duration of the construction period depending on proximity to the Proposed Development Site. This is due to demolition 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

12.69. The effects of demolition and clearance on the Representative Viewpoints will also be readily visible in the immediate area surrounding the Proposed Development, as the ZVT demonstrates, but less so within the core of the city centre. 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 impact magnitude, and significance of effect is therefore judged to be **moderate** to **minor adverse** in the following Zones: Hulme and Corridor Manchester, but **negligible** elsewhere where views are limited.

Operational phases

12.70. 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.

Assessment of Operational Phase Effects

Effects of completed Development on Townscape Character and Views

12.71. The visual and townscape effects of the completed Proposed Development are now summarised with respect to the effects of the Proposed Development on the Townscape Character through a narrative description of the nature of the effect on each of the Representative Viewpoints which lie within each character area.

12.72. The ZTV confirms that the Proposed Development will have a limited effect in the core city centre zones largely due to the presence of Deansgate Square, Elizabeth Tower and Axis developments. This situation applies to the following city centre zones:

- Victoria
- Northern Quarter
- Piccadilly Gardens
- Eastern Gateway
- The Village
- China Town
- Retail Core
- Chapel Street
- Salford
- Spinningfields
- St Johns

Petersfield

Viewpoint 1 Manchester Central

12.73. The townscape character is now dominated by modern and recent development with historic assets such as the Briton's Protection, a Grade II listed building, now overwhelmed by the tall buildings of Axis and Deansgate Square. Townscape sensitivity is judged to be low as a result reflecting a substantial ability to accommodate change in an area of medium townscape value. Visual Receptor sensitivity is similarly low with most receptors in transit and no appreciable focus to the view in this direction. The tram route dominates this view from the elevated viewpoint at the corner of Manchester Central and this is not a point where any specific view forms an important part of the experience or has any special cultural association, but it does represent a good niche view of the Proposed Development in the context of emerging development. In terms of magnitude of effect, the Proposed Development, which in this case consists of a single tower F2 which is visible, complements the townscape character seamlessly by consolidating the existing tall building cluster. Visually, the distinctive, irregular profile of the corners of the building sets it apart from other buildings in the cluster and adds diversity and depth to the view. Values of moderate beneficial magnitude of effect are recorded for this viewpoint for both townscape and visual receptors which translates to values of minor beneficial significance for both categories which is not significant in EIA regulation terms.

Viewpoint 2 Deansgate Tram station

12.74. A similar situation occurs here at one of the entrances / exits to Deansgate tram station. The view is once again dominated by the towers of Deansgate Square and River Street which rise up above recent apartments and offices in the foreground below. The townscape character is incoherent here and in a state of flux with both townscape receptor sensitivity and susceptibility judged to be low with substantial ability to accommodate change and with visual receptors who are, primarily, travellers largely in transit. In terms of magnitude of effect, the Proposed Development, which in this case consists of a single tower F2 which is visible, fits in well, and a value of moderate beneficial is recorded for both categories for this viewpoint. This translates to

values of **minor beneficial** significance for townscape and visual categories which is not significant in EIA regulation terms.

Viewpoint 3 Whitworth Street

12.75. Located at this busy interchange this viewpoint explores the impact on an area undergoing major townscape change. The older more historic features of the City Road Inn and Chester Road viaduct dominate the foreground but the middle and background is once again dominated by recent development including Owen Street and River Street. A rather incoherent townscape character results which has a substantial ability to accommodate change. A value of low townscape sensitivity is therefore ascribed to this viewpoint. In terms of visual receptor sensitivity this is a busy traffic node with most receptors in transit and no particular focus to the view so a value of low is registered for this viewpoint. Magnitude of effect for both townscape and visual receptors is recorded as minor beneficial as it consolidates the Deansgate Square cluster successfully but stands separate from it and subservient to the taller towers to the benefit of visual composition. A value of **negligible beneficial** significance of effect is recorded for both receptor categories which is not significant in EIA regulation terms.

Viewpoint 14 Deansgate

12.76. This viewpoint is located on one of Manchester's landmark streets Deansgate which is orientated towards the Proposed Development. The susceptibility of the townscape receptor at this junction is judged to be low in the context of so much tall building development which includes Beetham Hilton and Deansgate Square. Townscape sensitivity is raised to medium however, by the presence of the listed buildings on the east side of the street which contribute so much to its townscape character at this point. Visual receptors are mostly drawn from those in transit at this busy road junction but the presence of the listed building frontage on the view at this point raises visual receptor value such that visual receptor sensitivity is recorded as medium. The Proposed Development, of which both towers are partially visible, fits in well with the existing tall building cluster and is softened considerably both by the Beetham Hilton and the Deansgate Square developments such that negligible beneficial values are recorded for both the townscape and visual magnitude of effect. The significance of effect values are therefore registered as **negligible beneficial** for both categories which is not significant in EIA regulation terms.

Viewpoint 15 Deansgate

12.77. Located on the busy Chester Road at a major traffic junction this viewpoint affords a filtered view of the Proposed Development which lies directly behind the four Deansgate Square towers. The townscape character of this part of Manchester has changed radically in recent years and the Proposed Development will become a consistent part of it and there is little doubt that the Proposed Development will fit into this emerging townscape scene seamlessly. In townscape receptor sensitivity terms this viewpoint lies on the edge of the Castlefield Conservation Area with the adjacent railway viaduct in the foreground contributing well to the historical context at street level and supporting a value of medium townscape sensitivity for this viewpoint. Visual receptor sensitivity is, however, low as the bulk of receptors are users of the busy Chester Road at this point, augmented to some extent by users of the Hilton hotel which lies adjacent. Both towers of the Proposed Development register in this view but remain separate in both form, profile and location such that they do not compete overtly with the Deansgate Square cluster overtly. As a consequence, the townscape fit is complementary, and the view improved by added diversity and depth. Magnitude of effect is judged, therefore, to be minor beneficial for

both categories which translates to a significance of effect value of **minor beneficial** significance for townscape and **negligible beneficial** for visual receptors which is not significant in EIA regulation terms.

Viewpoint 11 Whitworth Street

12.78. This viewpoint is located at a busy traffic node which incorporates road, rail and tram networks in the view. Townscape sensitivity is judged to be low here as the focus of the view is away from the Whitworth Street Conservation Area which lies just behind. The susceptibility to accommodate change, in townscape terms is low in the context of the abundant supply of new tall buildings and modern development in close proximity. Visual receptor sensitivity is equally low as most receptors will be drawn from the category of travellers entering and exiting Oxford Road Station and accessing the city centre along Oxford Street. One of the towers, F2, aligns successfully with the street orientation and presents an oblique façade which complements the neighbouring Deansgate Square and stands out as an enhancement to the long distance view by providing a terminal focal point. Both townscape and visual fit are therefore deemed to be moderate beneficial which supports a significance of effect value of **minor beneficial** for both categories which is not significant in EIA regulation terms.

Civic Quarter

Viewpoint 12 St Peters Square

12.79. This viewpoint, located at the junction of Lower Moseley Street with Oxford Street, in the corner of St Peter's Square offers a niche view of the Proposed Development Site. Townscape susceptibility, value and consequently sensitivity are judged to be medium in the context of the Deansgate Square development. Similarly, 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 and the viewpoint is of regional importance in terms of visual receptor value. Only one tower, F2, is visible in this view but it is aligned directly with Lower Mosely Street, does not compete unduly with the Deansgate Square towers and enhances the view by forming a natural terminus in the view from St Peter's Square. It also fits in well with the emerging townscape character of the Great Jackson Framework masterplan. A value of minor beneficial is recorded for the magnitude of effect for both townscape and visual receptors which supports a significance of effect value of **minor beneficial** significance of effect for both categories which is not significant in EIA regulation terms.

Viewpoint 13 Albert Square

12.80. Albert Square is one of the pivotal civic spaces and most important squares in Manchester. Currently undergoing a programme of refurbishment and extended pedestrianisation access is only limited to the periphery. Both townscape and visual sensitivity are high but the Proposed Development, both towers of which are partially visible, does not feature significantly in the view where it occupies a distant, subordinate position on the horizon flanking the Deansgate Square towers. As a result, the magnitude of effect values for both townscape and visual receptors is judged to be negligible beneficial. This translates to a significant of effect value of **minor beneficial** significance which is not significant in EIA regulation terms.

Castlefield

Viewpoint 6 Castlefield basin

12.81. Castlefield basin sits within Castlefield Conservation Area 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, Elizabeth Tower, Chester Road and River Street 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 for the most part and represents a quiet, sunken oasis which is surrounded by busy transport routes. In terms of magnitude of effect, the Proposed Development, of which only one tower (F2) is visible, sits comfortably next to the Deansgate Square towers with its softened corners and cladding setting it apart from its neighbours. A value of minor beneficial for both receptor categories is therefore registered for this viewpoint. This translates to a significance of effect value of **minor beneficial** significance which is not significant in EIA terms.

Viewpoint 7 Chester Road roundabout

12.82. Receptor sensitivity in townscape terms is judged to be low here given the proximity of the roundabout and Mancunian Way which is located in an underpass at this point despite it being on the edge of the Castlefield Conservation Area. Susceptibility is also low as the area has a substantial ability to accommodate change manifest in the emerging towers of Deansgate Square and River Street. Visual receptor sensitivity is also judged to be low in the context for the dominating influence of the roundabout but the view is uninterrupted at this point and panoramic to some extent. The Proposed Development, of which only F1 is visible, blends into the Deansgate Square development seamlessly and consolidates the cluster. Importantly, from this perspective, the Proposed Development is at a lower height than its neighbour and skyline interest is maintained. The fit is both complementary in terms of townscape and visual characteristics and providing additional interest to the view so a value of moderate beneficial is registered here for this viewpoint. This supports a significance of effect value of **minor beneficial** significance.

Viewpoint 19 Chester Road (North)

12.83. The former Bridgewater Canal Offices which is Grade II Listed building sit within this view which is dominated by the development of Deansgate Square. Receptor sensitivity for townscape is affected to some extent here by its proximity to the Castlefield Conservation Area but the character of the Conservation Area is not strongly represented at this location. As a consequence, townscape receptor sensitivity is judged to be medium both in terms of susceptibility and value. Visual receptor sensitivity is variable, high for the inhabitants of the apartments that line Chester Road and low for users of the busy approach road medium overall. The Proposed Development, of which one tower, F1 is visible, has a strong but, once again, complementary, impact on both townscape and view here mirroring the form of its neighbours but subtly distinguishing itself from them through the use of a distinctive corner profile and cladding. Lower in height than its neighbour, it plugs a gap in the skyline in a consistent way that adds depth to the view and provides a complimentary fit in terms of townscape character. Magnitude of effect is judged to be moderate beneficial for both receptor categories. Significance of effect is therefore judged to be of **moderate beneficial** significance for both receptor categories. This is significant in EIA regulation terms.

Viewpoint 20 Ellesmere Street

12.84. A close up viewpoint which explores the effect of the Proposed Development on the church of St George, a Grade II* listed building in particular. Receptor sensitivity, in townscape terms, is judged to be medium acknowledging its status as a viewpoint within the Castlefield Conservation Area but also acknowledging its ability to accommodate some development manifest in the schemes on both side of the street and also the Deansgate Square and Crown Street developments. Visual receptor sensitivity is judged to be medium as this is now largely a residential district but close to the busy A 56. In terms of magnitude of change, clearly the Proposed Development will have very limited effect on the character of the local townscape, and on visual receptors, and this also applies to its impact on the setting of St George's Church. As a result, the magnitude of effect is judged to be negligible beneficial for both townscape and visual receptors as the effect is limited. The significance of effect therefore is judged to be **negligible beneficial** for both categories.

Water Street

Viewpoint 16 Trinity Way

12.85. 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. Deansgate Square and Elizabeth Tower are well represented here forming a cluster that marks the Great Jackson Street masterplan area as a major contribution to Manchester' s skyline. 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 has a good capacity to accommodate change. In terms of magnitude of effect, only the western most tower, F1,is fully visible from this viewpoint with F2 a background element. It balances the Deansgate Square cluster consistently allowing the tallest Deansgate Square to dominate the group. The irregular corner treatment helps the Proposed Development to distinguish itself from its neighbours and adds diversity to the view. The magnitude of effect therefore for both townscape and visual receptor categories is judged to be minor beneficial. A value of **minor beneficial** for townscape and **negligible beneficial** for visual receptors are recorded for this viewpoint both of which are judged to be not significant in EIA regulation terms.

Viewpoint 17 Regent Road / Trinity Way

12.86. The Proposed Development will have a minor impact on this view in the context of the numerous tall buildings which are now part of the baseline. Principal amongst them in this view is Deansgate Square. Receptor sensitivity is low here in visual receptor term as this viewpoint is located on the busy traffic interchange of Regent Street and the Inner Ring Road. Townscape receptor values are higher, conversely, as the viewpoint is located in the Castlefield Conservation Area although the area is judged to be able to accommodate change substantially without undue harm and is judged to be medium low as a result. Only the western tower, F1, is visible here but it is clearly separate and subordinate to the Deansgate Square cluster from this viewpoint. The fit with townscape character is good. Values of **minor beneficial** are recorded here for both categories which translates to **negligible beneficial** significance of effect which is not significant in EIA regulation terms.

Corridor Manchester

Viewpoint 10

12.87. Susceptibility to change in terms of townscape is high in this zone where the townscape is of high quality and high value, dominated as it is by historic mill buildings and a tight urban grain but with occasional vertical elements supplied by redundant, industrial chimneys. This also applies to visual receptors where a high proportion of viewers are residents in a quiet backstreet experiencing a high quality townscape setting. The viewpoint also provides a good location to view and experience a heritage asset. Both townscape and visual receptor sensitivity are therefore judged to be high. The Proposed Development, of which only one tower, F2, is visible, will form a low background building emulating to some extent the background vertical form of the mill chimney but stepping up to the higher Deansgate Square tower behind. The composition if the view is not disturbed as a result and form echoes features of foreground townscape character but modern cladding materials clearly allow historical differentiation and avoids conflict. Magnitude of effect can be described as minor beneficial for both receptor categories. This supports a judgement of moderate beneficial significance of effect for both visual and townscape categories which is significant in EIA regulation terms.

Great Jackson Street

Viewpoint 5 Great Jackson Street from Chester Road

12.88. A close up view directed into the heart of the Great Jackson Street framework area, this oblique view explores the way in which the Proposed Development relates to the emerging baseline. Both townscape sensitivity and visual receptor sensitivity are judged to be low here as the area is changing rapidly and the townscape has a substantial ability to accommodate development without undue harm and there are no designations in terms of heritage or ecology. The key visual receptor group are travellers in vehicles or on bicycles so visual receptor sensitivity is generally low. In terms of magnitude of effect the Proposed Development, which in this case is represented by one tower F1 which is visible, reflects the form and height of the tallest of the Deansgate Square towers but is differentiated in terms its edge and irregular corner profile. The fit here is complementary for townscape and visual receptors and the composition of the view is enhanced as depth and diversity are both improved. The magnitude of effect for both categories is therefore judged to be moderate beneficial which translates to a significance of effect value of minor beneficial which is not significant in EIA regulation terms.

Hulme

Viewpoint 8 St Wilfrid's Park

12.89. 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 taken in the middle of the park offers expansive views across the park and also illustrates the manner in which the view is changing dramatically as the Deansgate Square towers emerge as the principal focus of the view. Receptor sensitivity is judged to be medium here for townscape as it has some capacity to accommodate change. 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 any feature of special significance. In terms of magnitude of effect, the two Plot F towers F1 and F2 are both fully visible and consolidate the tall building cluster. The orientation of tower F1 in particular

directs and deflects the view towards the tallest Deansgate Square tower with its angled inner face. Both towers are subordinate in height in comparison to the tallest tower so the composition and stability of the cluster remains unaffected. The Proposed Development fits in well with the emerging townscape character, dominated as it is by tall buildings at this point so a value of moderate beneficial is registered for both categories in terms of magnitude of effect. This translates to a value of **moderate beneficial** significance of effect which is significant in EIA regulation terms.

Viewpoint 9 Humberstone Avenue

12.90. This viewpoint situated in a quiet residential street at the edge of St Wilfrid's Park and directly aligns with the Proposed Development. Both townscape and receptor sensitivity are judged to be high here in the context of a street with a strong and coherent sense of townscape character occupied primarily by residential receptors. Magnitude of change, however, is limited as the tower that is visible in this view occupies the same visual footprint as one of the Deansgate Square towers. Differentiation is maintained however as the irregular wavy edged corners distinguish the Proposed Development from its neighbours. A value of minor beneficial is registered here for magnitude of effect and a value of **moderate beneficial** significance for both townscape and visual receptors which is **significant** in EIA regulation terms.

Viewpoint 10 Stretford Road bridge

12.91. 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 and Deansgate Square and River Street can clearly be 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. Visual receptor sensitivity is judged to be low also. Although it is a residential area the presence of Princess Road as a busy route and lack of any formal designation i.e. a Conservation Area, reduces its sensitivity. Magnitude of effect is judged to be minor beneficial as the two towers of the Proposed Development F1 and F2 fit in readily to those that already occupy much of the horizon and the townscape character is consolidated as a result. This translates to a value of **minor beneficial** for both receptor categories in terms of significance of effect which is not significant in EIA regulation terms.

Viewpoint 18 Jackson Crescent

12.92. Once again, the towers of Deansgate Square, Beetham Hilton and Elizabeth tower dominate this view with the River Street tower framing the view to the south. The street is a typical residential street in Chorlton which in townscape terms has absorbed much background change in recent years susceptibility to accommodate change is judged to be low in an area without designation in terms of townscape value. Townscape sensitivity is therefore low. Visual receptor sensitivity, conversely, is higher as this is a quiet residential street where open views are enjoyed by residents. Visual receptor value is low however, as there are no designations so visual receptor sensitivity is medium overall. Both towers F1 and F2 are clearly visible here and both consolidate the Deansgate Square cluster but F2 improves the composition notably by taking the edge of the cluster south. Two faces of each tower are visible in these views which adds depth and the wavy edge profile distinguishes them from their neighbours. In terms of magnitude of effect therefore the value is judged to be moderate beneficial for both categories. This translates to a value of **minor beneficial** significance of effect for townscape receptors but **moderate beneficial** significance for visual receptors.

Assessment of Cumulative Effects

12.93. The cumulative effect of the Proposed Development is now examined in relation to intra- project and inter-project cumulative effects.

Intra- project cumulative effects

12.94. It is judged that there are no intra- project cumulative effects arising in relation to other environmental topics under consideration in this assessment.

Inter-project cumulative effects

12.95. 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 Development Site, there are developments that cumulatively, are considered to affect the significance values for townscape and views. Table 12.9 summarises these schemes. Details of the Cumulative schemes are outlined in the ES Appendices.

Table 12.9 Cumulative schemes

Planning reference	Cumulative Scheme	No of storeys
	Blade and Circle	51 and 51
114385/FO/2016	Union T1, St Johns Street	36 and 8
116850/FO/2017	Transition (Detrafford)	32, 26 and 18
123261/FO/2019	Arundel Street, Manchester	8, 9, 11 and 23
111003/FO/2016/C1	Whitworth St West	35
	Bauer Millet	
125804/FO/2019	325-327 Deansgate	22
129406/FO/2021	Land at Deansgate South	28
116850/FO/2017	Great Jackson Street – Plot E and G	56

12.96. 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 Manchester. In order, therefore, to assess the cumulative effect in a more systematic way, Table 12.10, has been compiled to summarise the effect of the Proposed Development on its own and then in respect of the relevant cumulative scheme on a viewpoint by viewpoint basis. Where a cumulative scheme is predicted to have an effect on a particular viewpoint or townscape character then the effect values are reassessed and adjusted accordingly to take the scheme or schemes into account, if it is judged that there is, in fact, a cumulative effect.

12.97. 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 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 Development completely which occurs in a few cases.

Table 12.10 Plot F TVIA Cumulative 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)

Location	Development Only	Relevant Cumulative Scheme	Cumulative Effect
1 Manchester Central			
Sensitivity (VR)	Low	Gt Jackson	
Sensitivity (T)	Low	St,Whitworth St	Negligible
Magnitude (VR)	Moderate Beneficial	west, Bauer Millet	beneficial
Magnitude (T)	Moderate Beneficial		
Significance of effect	Minor Beneficial		
2 Deansgate/ Castlefield Tram station			
Sensitivity (VR)	Low	Blade and circle, Gt	Negligible
Sensitivity (T)	Low	Jackson St, Detrafford,	beneficial
Magnitude (VR)	Moderate Beneficial	St, Whitworth St west	
Magnitude (T)	Moderate Beneficial		
Significance of effect	Minor Beneficial		
3 Whitworth Street / Albion St			
Sensitivity (VR)	Low	Gt Jackson St,	Negligible
Sensitivity (T)	Low	Whitworth St	beneficial
Magnitude (VR)	Minor beneficial	west	
Magnitude (T)	Minor beneficial		
Significance of effect	Negligible beneficial		
4 Cambridge Street			
Sensitivity (VR)	High	Gt Jackson St	
Sensitivity (T)	High		Minor beneficial
Magnitude (VR)	Minor Beneficial		
Magnitude (T)	Minor Beneficial		
Significance of effect	Moderate Beneficial		

Location	Development Only	Relevant Cumulative Scheme	Cumulative Effect
5 Gt Jackson Street			
Sensitivity (VR)	Low		
Sensitivity (T)	Low	Gt Jackson St,	Negligible
Magnitude (VR)	Moderate Beneficial	De Trafford	beneficial
Magnitude (T)	Moderate Beneficial		
Significance of effect	Minor Beneficial		
6 Castlefield basin			
Sensitivity (VR)	Medium	Blade and circle, Gt	
Sensitivity (T)	Medium	Jackson St,	Negligible
Magnitude (VR)	Minor Beneficial	Deansgate South	beneficial
Magnitude (T)	Minor Beneficial	St, Detrafford,	
Significance of effect	Minor Beneficial		
7 Mancunian Way			
Sensitivity (VR)	Low		
Sensitivity (T)	Low	Gt Jackson St,	Negligible
Magnitude (VR)	Moderate Beneficial	Detrafford	beneficial
Magnitude (T)	Moderate Beneficial		
Significance of effect	Minor Beneficial		
8 St Wilfrid's Park			
Sensitivity VR	Medium	Gt Jackson St,	
Sensitivity T	Medium	Deansgate South	Minor
Magnitude VR	Moderate beneficial	St,	beneficial
Magnitude T	Moderate beneficial	Detrafford,	
Significance of effect	Moderate beneficial	Arundel St	
9 Humberstone Avenue			
Sensitivity (VR	High	Gt Jackson St	
Sensitivity (T)	High		Negligible
Magnitude (VR)	Minor beneficial		beneficial
Magnitude (T)	Minor beneficial		
Significance of effect	Moderate beneficial		
10 Stretford Road / Princess Road			
Sensitivity (VR)	Low	Gt Jackson St,St John's St,	
Sensitivity (T)		325 Deansgate	

Location	Development Only	Relevant Cumulative Scheme	Cumulative Effect
Magnitude (VR)	Low		Negligible
Magnitude (T)	Minor beneficial		beneficial
Significance of effect	Minor beneficial		
	Minor beneficial		
11 Whitworth St			
Sensitivity (VR)	Low	Gt Jackson St	
Sensitivity (T)	Low		
Magnitude (VR)	Moderate Beneficial		Negligible
Magnitude (T)	Moderate Beneficial		beneficial
Significance of effect	Minor Beneficial		
12 St Peter's Square			
Sensitivity (VR)	Medium	Gt Jackson St,	
Sensitivity (T)	Medium	Whitworth St	Negligible
Magnitude (VR)	Minor Beneficial	west	beneficial
Magnitude (T)	Minor Beneficial		
Significance of effect	Minor Beneficial		
13 Albert Square			
Sensitivity (VR)	High	Gt Jackson	
Sensitivity (T)	High	St,	Negligible
Magnitude (VR)	Negligible Beneficial	Whitworth St west, Bauer Millet	beneficial
Magnitude (T)	Negligible Beneficial		
Significance of effect	Minor Beneficial		
14 Deansgate			
Sensitivity (VR)	Medium	Gt Jackson	
Sensitivity (T)	Medium	St, 325 Deansgate,	Negligible
Magnitude (VR)	Negligible Beneficial	Bauer Millet	beneficial
Magnitude (T)	Negligible Beneficial		
Significance of effect	Negligible Beneficial		
15 Deansgate			
Sensitivity (VR)	Low	Deansgate South,	Negligible
Sensitivity (T)	Medium	Detrafford	beneficial
Magnitude (VR)	Minor Beneficial	325 Deansgate,	
Magnitude (T)	Minor Beneficial		
Significance effect (VR)	Negligible Beneficial		

Location	Development Only	Relevant Cumulative Scheme	Cumulative Effect
Significance effect (T)	Minor beneficial		
16 Trinity Way			
Sensitivity (VR)	Medium	Blade and circle, Gt Jackson St, Deansgate South St, Detrafford, Whitworth St West, 325 Deansgate, Bauer Millet, Arundel St	Negligible beneficial
Sensitivity (T)	Low		
Magnitude (VR)	Minor Beneficial		
Magnitude (T)	Minor Beneficial		
Significance effect (VR)	Negligible Beneficial		
Significance effect (T)	Minor Beneficial		
17 Regent Road / Trinity Way			
Sensitivity (VR)	Low	Blade and circle, Gt Jackson St, Bauer Millet, Arundel Street	Negligible beneficial
Sensitivity (T)	Medium/Low		
Magnitude (VR)	Minor Beneficial		
Magnitude (T)	Minor Beneficial		
Significance of effect	Negligible Beneficial		
18 Jackson Crescent			
Sensitivity (VR)	Medium	Blade and circle, Gt Jackson St, Detrafford,	Negligible beneficial
Sensitivity (T)	Low		
Magnitude (VR)	Moderate beneficial		
Magnitude (T)	Moderate beneficial		
Significance effect (VR)	Moderate beneficial		
Significance effect (T)	Minor beneficial		
19 Chester Road (North)			
Sensitivity (VR)	Medium	Gt Jackson St, Detrafford	Minor beneficial
Sensitivity (T)	Medium		
Magnitude (VR)	Moderate Beneficial		
Magnitude (T)	Moderate Beneficial		
Significance of effect	Moderate Beneficial		

Location	Development Only	Relevant Cumulative Scheme	Cumulative Effect
20 Ellesmere Street			
Sensitivity (VR)	Medium	Gt Jackson St	Negligible
Sensitivity (T)	Medium		beneficial
Magnitude (VR)	Negligible Beneficial		
Magnitude (T)	Negligible Beneficial		
Significance of effect	Negligible Beneficial		

Mitigation Measures

Mitigation of effects during the construction phase

12.98. 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

12.99. Mitigation measures for the operational phase are focussed on embedded mitigation measures which are an integral part of the design of the building 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 neighbouring buildings and its location.

Residual Effects

12.100. 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 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 8.10 above.

Summary

12.101. This Townscape and Visual Impact Assessment examines the impact that the Proposed Development will have on the townscape of Manchester City Centre and on the townscape character of the city centre zones immediately surrounding the Proposed Development in particular. It does so in a systematic, rational and objective way using established methodologies and practices contained in GLVIA 3. The impact of the Proposed Development on its own is explored and then in conjunction with consented and committed development in a Cumulative Assessment.

12.102. A computer modelling process was employed to provide an accurate series of accurate, verified images (AVRs) which illustrate, and inform, the nature of the impact the Proposed Development will have on a series of selected and agreed Representative Viewpoints and the townscape character on a 360 degree basis.

12.103. Although it is not possible to provide one single summary value for the impact the Proposed Development will have on Manchester City Centre it is possible to summarise the effects in general terms.

12.104. In this regard Table 12.10 records that in most cases, the Proposed Development will have minor to negligible, or occasionally where it features as a dominant element in the view or townscape character, moderate, significance of effect. Accordingly, all effects, with the exception of four viewpoints, are therefore recorded as being not significant in EIA terms. All effects are recorded as beneficial.

12.105. The principal reason behind this is the proximity of the Proposed Development to neighbouring tall buildings such as Deansgate Square, Elizabeth Tower and River Street and the positive contribution the Proposed Development will make to this cluster. The Proposed Development therefore complements and fits in with this emerging pattern of townscape character in a consistent way.

12.106. In terms of cumulative effects the effects are diminished in most cases due to the large amount of proposed cumulative development.

References

Ref . No.	Reference
12.1	The European Landscape Convention (ELC, 2000)
12.2	National Planning Policy Framework 2019 Dept Communities and Local Government
12.3	Manchester City Council Core Strategy 2012
12.4	Great Jackson Street Development Framework 2018 Update, Deloitte Real Estate
12.5	Guidelines for Landscape and Visual Impact Assessment 3rd Edition 2013 landscape Institute and Institute of Environmental Management and Assessment
12.6	Historic England note on tall building 2014
12.7	Manchester Residential Quality Guidance MCC 2017
12.8	Landscape Institute Technical Guidance Note 06 /19

13. Traffic and Transport

Introduction

13.1. This Chapter of the ES has been prepared by Curtins assesses the likely significant effects of the Proposed Development with respect to Traffic and Transport. 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 negative effects; and the likely residual effects after these measures 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. This Chapter has been prepared in accordance with the EIA Scoping Report, dated June 2021 and contained in Appendix 2.1 of this ES, and the response contained at Appendix 2.2.

Legislative and Policy Context

13.4. This section of theChapter sets out the key transport policy and guidance documents that are relevant to the Proposed Development.

13.5. The relevant sections of the following key transport policy and guidance documents are summarised in the TA:

- National Planning Policy Framework (2021);
- National Planning Practice Guidance (2020);
- Manchester Core Strategy (2012 – 2027);
- Greater Manchester Transport Strategy 2040;
- Manchester Residential Quality Guidance (2016); and
- Great Jackson Street Development Framework (2018).

13.6. Additionally, the key guidance documents that are relevant to the Proposed Development are set out below:

- Manchester Residential Quality Guidance (2016);
- Great Jackson Street Development Framework (2018);
- Guidelines for the Environmental Assessment of Road Traffic (1993);
- Guidelines for Providing for Journeys on Foot (2000);
- Integrating Cycling into Development Proposals (2008);
- Buses in Urban Developments (2018); and
- Design Manual for Roads and Bridges (Various Dates).

13.7. The above policy and guidance documents have been taken into account in the preparation of this Chapter of the ES.

Assessment Methodology and Significance Criteria

13.8. The assessment methodology will consist 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.

13.9. The extent of the study area has been defined using a combination of IEMA Guidelines[75] 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.

13.10. The environmental impacts of traffic generated by the Proposed Development have been assessed in line with the criteria set out in 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.

13.11. 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 was required.

13.12. 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.

13.13. 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).

13.14. The assessment methodology for each potential impact is set out below.

Driver Delay

13.15. The accompanying TA (Appendix 13.1) includes junction capacity assessments for the study area

[75] Institute of Environmental Management and Assessment, (1993). 'Guidelines for the Environmental Assessment of Road Traffic'.

using the industry standard software package – Junctions. These programs give output ratios of flow to capacity (RFC), queue lengths and delays, which give an indication of the overall operational capacity of the junctions.

13.16. 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 below:

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

13.17. 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.

13.18. 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 below:

Table 13.2 – Driver Delay for Public Transport 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
No Change	No perceptible change in delay at junctions along bus routes

Pedestrian Delay

13.19. 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.

13.20. 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 below:

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

13.21. 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.

13.22. 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 Heavy Goods Vehicle (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 below:

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	Less than doubling of traffic flow or HGV component where the footway width is satisfactory

Magnitude of Change (Impact)	Threshold
No Change	No perceptible change in traffic flow or HGV component, and therefore no perceptible change in pedestrian amenity

Fear and Intimidation

13.23. 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.

13.24. In addition, The Guidelines for the Environmental Assessment of Road Traffic gives the following example of fear and intimidation hazard definition:

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

13.25. 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 below:

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

13.26. 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.

13.27. 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."

13.28. 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.

13.29. 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

13.30. 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.

13.31. 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 below:

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).

Magnitude of Change (Impact)	Threshold
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

13.32. 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 guidance by effect, see Table 13.9 below;
- Magnitude – relates to the degree of alteration from the baseline in accordance with the IEMA guidance 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 permeant 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.

13.33. 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

Importance	Receptors
International	None
National	None
Regional	Drivers along the A57 (M) Mancunian Way and the A56 Chester Road

Importance	Receptors
Local	Pedestrians, cyclists, and public transport users within the vicinity of the Proposed Development Drivers along the local highway network

13.34. 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.

13.35. Sensitivity judged as Very High or High results in Rule 2 being considered for that highway link. Sensitivity judged as Medium, Low or Negligible results in Rule 1 being considered for that highway link.

13.36. The magnitude of change (impact) resulting from the Proposed Development, has been assessed using the following scale, based on the assessments contained within the TA and with consideration to relevant guidance:

- Major;
- Moderate;
- Minor;
- Negligible; and
- No change.

13.37. The significance criteria of effects have been determined using professional judgement that underpins the attribution of significance. Each effect has been assessed against the sensitivity of the receptor and the magnitude of change, as shown in the Table 13.10 below. 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 criterion.

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

13.38. 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;
- Neutral;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

13.39. Effects that are classified as Major or Moderate are considered to be significant. Effects classified as Minor or Neutral are considered to be not significant.

Limitations and Assumptions

13.40. The Proposed Development is expected to be completed, in full, by December 2027. The impact of the Proposed Development upon the local road network in future years has been discussed with Manchester City Council (MCC) Highways and a future year of 2028 has been agreed. For the purpose of this ES chapter, the Proposed Development has been considered in full, with both phases completed (Scenario 5). This is considered a robust approach that covers a worst-case scenario. It has been concluded that once Phase 1 is completed and operational, any construction traffic related with Phase 2 will be less than the traffic generated by a completed and operational Phase 2.

13.41. MCC Highways Officers have also agreed that base flows for the 2028 year can be extracted from the Crown Street Phase 2 development (MCC planning reference: 126668/FO/2020), also part of the same SRF, which was approved last year. This data was used to support various major

developments in this part of Manchester in recent years. It is considered the most representative of a typical baseline year due to being pre-COVID-19.

13.42. The extracted AM and PM traffic flows from the Crown Street Phase 2 TA are robust and consider a 2028 assessment year with growth and all committed development over the past 5-6 years. Additionally, new committed development has been added to create a cumulative assessment scenario, which is reported later in this Chapter. The list of cumulative development is set out in Chapter 2 of this ES and its appendices (Scoping Report Appendix 2.1)

13.43. The commissioning of new survey data was considered and discussed with MCC Highways. It is Curtins' view that traffic surveys in the immediate vicinity of the Site would not be representative of typical traffic conditions, as the Melbourne Street junction opposite the Site is currently closed due to construction work. There is also a high level of general construction activity in the area related to adjacent sites. These factors would significantly reduce the reliability of any new survey data.

13.44. The extracted traffic flows from the Crown Street Phase 2 TA are robust and consider a 2028 assessment year with background traffic growth and committed developments. On this basis, and for the reasons outlined above, the use of this data from this recent consent is considered reasonable and appropriate.

13.45. The mode share for the Proposed Development was derived from 2011 Census Journey to Work data by Mode for the Manchester 060 Mid Super Output Area (MSOA). Notwithstanding, the Proposed Development will encourage active and sustainable travel as low or zero carbon alternatives to travel by the private car, and therefore this is considered to be a robust, worst-case assessment of trip generation.

13.46. Junction capacity assessments have been undertaken using the industry-standard junction modelling software package Junctions, more details of which are provided within the accompanying TA (Appendix 13.1). This program provides an accurate reflection of junction capacities when used appropriately, but there are various assumptions included within each model.

13.47. Annual Average Daily Traffic (AADT) data and HGV percentages have been provided by the Air Quality Consultant (Ensafe), with the exception of Links 3 and 4, which have been obtained from the Deansgate Square (Planning Reference: 111719/FO/2016/C1) approved Transport Assessment, with the percentage HGV estimated based on neighbouring data.

Baseline Conditions

Local Highway Network

13.48. Full details of the local highway network are contained in the Transport Assessment (Appendix 13.1), with the relevant maps and plans contained as figures.

Great Jackson Street

- 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;
- Great Jackson Street comprises a single carriageway with a typical width of 10m;
- There are also footways of an average 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; and
- Great Jackson Street is in Zone 4 of Manchester City Centre's Controlled Parking Zone (CPZ). There are also Traffic Regulation Orders (TROs) present in the form of double yellow line parking restrictions.

Garwood Street

- Garwood Street serves as a link between Great Jackson Street / City Road East and the A57 Mancunian Way;
- The speed is limited to 20mph along Garwood Street;
- Garwood Street comprises a single carriageway of approximately 10m in width and wide footways of up to 5m on both sides of the road. There are also some street light columns; and
- The road is also within Zone 4 of the CPZ and has 3 P&D bays adjacent to the eastern boundary of the Site. There are also TROs in the form of double yellow line parking restrictions at the major junctions.

Melbourne Street

- Melbourne Street serves as a link between Great Jackson Street and the A57 Mancunian Way;
- Speed is limited to 20mph along Melbourne Street;
- Melbourne Street comprises a single carriageway of approximately 7m in width and footways of c.2.5m on both sides of the road. There are also 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 TROs in the form of double yellow line parking restrictions along the rest of the carriageway and junctions; and
- 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.

A57 Mancunian Way

- The A57 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;
- In the vicinity of the Site, the A57 Mancunian Way comprises a dual carriageway with a total width of 28m and up to three lanes in each direction; and
- The road is subject to a speed limit of 50mph and is lit by regularly spaced lighting columns.

A56 Chester Road

- The A56 Chester Road is one of the main radial routes into Manchester City Centre;
- In the vicinity of the Site, Chester Road has an overall carriageway width of around 19m;
- 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; and
- There are bus stops on both sides of Chester Road.

Owen Street

- Owen Street currently links Deansgate with Great Jackson Street;
- Owen Street has undergone a major refurbishment as part of the SRF proposals;
- The road is privately owned and has barrier 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 currently only provided along the eastern footway, as the western footway will be built as part of other plots of the SRF; and
- On-street parking is restricted by double red line markings along the entirety of the road.

River Place

- River Place is a no through route providing access to local residential buildings. It also provides an exit route for servicing vehicles coming off Deansgate Square via a barrier system along Pond Street;
- The carriageway is two-way and c.5m wide. Footways of c.2m in width are provided along both sides of the road; and
- There are TROs in the form of single yellow line parking restrictions along both sides of the carriageway with double yellow line parking restrictions at junctions.

Highway Safety

13.49. Full details of the Highway Safety are contained in the Transport Assessment (Appendix 13.1), with the relevant tables and figures.

13.50. Personal Injury Collision data for the main junctions along the highway network adjacent to the Site has been obtained from the Transport for Greater Manchester reported road collisions database for the most recent five-year period.

13.51. There has been a total of 28 collisions recorded in the latest five-year period available, which resulted in 22 slight injuries and 6 serious injuries. There are no fatal injuries recorded in the vicinity of the Site.

13.52. There have been no collisions recorded in the immediate vicinity of the Site along Great Jackson Street according to TfGM's available data.

13.53. On the above basis, it is clear that the safety record is not particularly onerous or indicative of a pre-existing safety problem 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

13.54. Full details of the Pedestrian Accessibility are contained in the Transport Assessment (Appendix 13.1), with the relevant tables, figures and plans contained within the report and its appendices.

13.55. The pedestrian catchment plan contained in the TA confirms that the Site is well located in relation to local services and facilities within Manchester. Most notably, several bus stops along

the A56 Chester Road and A5103 Medlock Street are located within a 500m walking catchment.

13.56. To the east of the Site, the Oxford Road rail station is accessible within 1,000m, amongst many employment, education, health, retail and leisure opportunities.

13.57. At 2,000m beyond the Site, the whole of Manchester City Centre is included.

13.58. 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 existing and future users when routing to / from Manchester City Centre.

13.59. 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.

13.60. 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

13.61. Full details of the Cycle Accessibility are contained in the Transport Assessment (Appendix 13.1), with the relevant tables, figures and plans contained within the report and its appendices.

13.62. A 8km catchment from the Site extends as far as Blackley in the north, Fairfield to the east, Didsbury in the south and Trafford Park to the west.

13.63. 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.

13.64. 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.

13.65. 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.

13.66. National Cycle Route 6 is located some 650m to the north of the Site on Liverpool Road. Route 6 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.

13.67. The Site is surrounded by Beeways and confirmed infrastructure improvements, allowing existing and future users to benefit from better safety and quality of commute.

13.68. The Site is therefore considered to be highly accessible by bicycle, and would provide a realistic alternative to travel by car.

Public Transport Accessibility

13.69. 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.

13.70. 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'). The Site is located in an area with a GMAL rating of 8, with excellent accessibility. This is a particular strength of the Site, which offers strong multi-modal links opportunities.

Bus Accessibility

13.71. Full details of the Bus Accessibility are contained in the Transport Assessment (Appendix 13.1), with the relevant tables, figures and plans contained within the report and its appendices.

13.72. The nearest bus stop is located to the north-east of the Site on Medlock Street, within a c.400m walk. The bus stops along Whitworth Street West and opposite the Deansgate rail station, located c.550m to the north of the Site, offer more services and the number 2 Free Bus.

13.73. There is a reasonably good frequency of bus services stopping close to the Site which provide convenient access to locations such as The Trafford Centre, Manchester City Centre, Urmston and Stretford, amongst others.

13.74. Overall, the Site is well served by bus. The Site also benefits from the free bus service that operates along Whitworth Street West.

Rail Accessibility

13.75. Full details of the Rail Accessibility are contained in the Transport Assessment (TA), with the relevant tables, figures and plans contained within the report and its appendices.

13.76. The nearest railway station is Deansgate Railway Station, located approximately 600m to the north of the Site.

13.77. The rail services that run to Deansgate Railway Station provide 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.

13.78. It is therefore considered the Site is highly accessible via rail.

Metrolink (Light Rail) Accessibility

13.79. Full details of the Metrolink Accessibility are contained in the Transport Assessment (TA), with the relevant tables, figures and plans contained within the report and its appendices.

13.80. There are Metrolink stops located at Deansgate-Castlefield (c.550m walking distance north of the Site).

13.81. 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.

13.82. It is therefore considered that the Site is highly accessible via Metrolink.

Accessibility by Sustainable Modes Summary

13.83. 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.

13.84. 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.

Identification and Evaluation of Significant Effects

Construction Phase

13.85. 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.

13.86. Vehicles would arrive via links that have significant baseline flows (such as the A57 (M) Mancunian Way and the A56 Chester Road). The anticipated number of trips related with the construction of the development has been provided by Renaker Build Limited based on their recent experience of similar developments in the area:

Table 13.11 – 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

13.87. The above information indicates that at the peak of construction activity, there would be up to 90 daily trips, which equates to approximately 12 hourly trips. During the steady state of construction, there would be up to 28 daily trips, which equates to approximately 4 hourly trips.

13.88. When compared to the existing traffic flows on the local highway network, this volume of construction traffic (between 4-12 hourly trips) would fall below the IEMA assessment thresholds detailed earlier in this Chapter for all links except Link 6 Melbourne Street. However, 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. A full assessment of Link 6 is provided in the next section of this ES Chapter.

13.89. As described in the TA at Appendix 13.1, the existing Site is currently occupied by the site cabins and surface car parking associated with the construction of the Deansgate Square development. There is also a high level of general construction activity in the local area related to adjacent development sites.

13.90. On this basis, the construction phase is therefore likely to have a direct, temporary, short-term (reversible), neutral effect at a local level, which is not significant.

Operational Phase

13.91. In line with the IEMA assessment criteria detailed earlier in this Chapter, the effects of the operational phase of the Proposed Development has been assessed based on two rules (10% / 30% changes in traffic flows).

13.92. It is considered that the sensitivity of the links in the study area are generally 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.

13.93. 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%).

13.94. The percentage impact of the Proposed Development has been calculated for each link in the following table. This assessment compares the 'Base' with the 'Base + Development' scenarios:

- Base = 2028 Baseline (flows from Crown Street Phase 2 TA, which included committed development up to the date of submission); and
- Base + Proposed Development = 2028 Baseline + Proposed Development flows.

13.95. The links for assessment are shown in Table 13.12 below (some of the links in the AM / PM peak periods appear blank as not all links were included on the Crown St Phase 2 TA):

Table 13.12 – Flows per Link and Scenario

Link		Scenario 1. 2028 Base			Scenario 2. Base + Dev		
No.	**Description**	**AM Peak**	**PM Peak**	**24h AADT**	**AM Peak**	**PM Peak**	**24h AADT**
1	A56 Chester Road (between Deansgate Interchange and Great Jackson Street)	2557	2476	25800	2666	2476	26441
2	A56 Chester Road (between Great Jackson Street and Deansgate)	2533	2253	24626	2607	2253	25303
3	Great Jackson Street (between A56 Chester Road and Melbourne Street)	280	319	3872	314	279	3835

No.	Link Description	Scenario 1. 2028 Base			Scenario 2. Base + Dev		
		AM Peak	PM Peak	24h AADT	AM Peak	PM Peak	24h AADT
4	Deansgate (between A56 Chester Road and Owen Street)	677	553	5075	751	580	5752
5	A56 Chester Road (between Deansgate and Whitworth Street W)	1894	1836	19564	1894	1836	19564
6	Melbourne Street	24	3	140	22	70	424
7	Great Jackson Street (between Melbourne Street and Garwood Street)	274	378	4369	311	336	4334
8	Garwood Street	204	299	1354	193	322	1541
9	City Road East	282	229	2284	300	250	2541
10	River Street	-	-	1891	-	7	1923
11	Medlock Street (between City Road East and River Street)	1118	783	17289	1136	806	17541
12	Medlock Street (between River Street and A57 Mancunian Way)	-	-	16666	26	30	16952
13	A57 Mancunian Way (east of Princess Road)	-	-	29476	34	27	29795
14	A5103 Princess Road	-	-	54125	4	2	54158
15	A57 Mancunian Way (between Princess Road and Garwood Street)	-	-	82398	11	-	82493
16	A57 Mancunian Way (between Garwood Street and Melbourne Street)	-	-	82398	-	22	82493
17	A57 Mancunian Way (between Deansgate Interchange and Melbourne Street)	-	-	82398	-	92	82493
18	Egerton Street	-	-	75859	59	48	76413

No.	Link Description	Scenario 1. 2028 Base AM Peak	PM Peak	24h AADT	Scenario 2. Base + Dev AM Peak	PM Peak	24h AADT
19	A57 Chester Road (south of Deansgate Interchange)	-	-	36527	49	40	36986
20	Chorlton Road	-	-	13393	1	1	13398

13.96. The following Table 13.13 shows a comparison of the percentage impact of the Proposed Development (Scenario 2):

Table 13.13 – Scenario Comparison

No.	Link Description	Proposed Development Impact AM Peak	PM Peak	24h AADT
1	A56 Chester Road (between Deansgate Interchange and Great Jackson Street)	4.24%	0.00%	2.48%
2	A56 Chester Road (between Great Jackson Street and Deansgate)	2.93%	0.00%	2.75%
3	Great Jackson Street (between A56 Chester Road and Melbourne Street)	12.25%	-12.47%	-0.95%
4	Deansgate (between A56 Chester Road and Owen Street)	10.97%	4.85%	13.34%
5	A56 Chester Road (between Deansgate and Whitworth Street W)	0.00%	0.00%	0.00%
6	Melbourne Street	-6.81%	**2221.22%**	**203.29%**
7	Great Jackson Street (between Melbourne Street and Garwood Street)	13.52%	-11.19%	-0.80%
8	Garwood Street	-5.36%	7.89%	13.76%
9	City Road East	6.33%	8.98%	11.27%
10	River Street	-	-	1.71%
11	Medlock Street (between City Road East and River Street)	1.58%	2.94%	1.46%

No.	Link Description	Proposed Development Impact		
		AM Peak	PM Peak	24h AADT
12	Medlock Street (between River Street and A57 Mancunian Way)	-	-	1.71%
13	A57 Mancunian Way (east of Princess Road)	-	-	1.08%
14	A5103 Princess Road	-	-	0.06%
15	A57 Mancunian Way (between Princess Road and Garwood Street)	-	-	0.12%
16	A57 Mancunian Way (between Garwood Street and Melbourne Street)	-	-	0.12%
17	A57 Mancunian Way (between Deansgate Interchange and Melbourne Street)	-	-	0.12%
18	Egerton Street	-	-	0.73%
19	A57 Chester Road (south of Deansgate Interchange)	-	-	1.26%
20	Chorlton Road	-	-	0.04%

13.97. The assessment shows that a percentage change as a result of the Proposed Development greater than 30% would only be observed at link 6 (Melbourne Street). The changes in traffic flows are significantly greater than 30% due to the low baseline traffic flows along this link. Melbourne Street is a minor highway link that adjoins the A57 (M) Mancunian Way with other local roads. There are alternative routes available from the east and west, which is a likely cause of the low level of baseline traffic.

13.98. As the impact of the completed development is less than 30% across all the remaining links, no further assessment is necessary.

13.99. Further assessment of driver delay, public transport users, pedestrian delay, pedestrian amenity, fear and intimidation, severance, and collisions and road safety for the Melbourne Street Link are provided in the following sub-sections.

Driver Delay

13.100. The delay statistics from the junction capacity assessments in the TA (Appendix 13.1) have been used for this assessment.

13.101. The Melbourne Street link has been assessed as per the existing situation, which comprises a priority junction, and has been assessed using the Junctions software. The results are shown in Table 13.14:

Table 13.14 – Driver Delay – Change in Delay per Vehicle

Link No.	Link Description	Base (in s) AM Peak	Base (in s) PM Peak	Base + Dev (in s) AM Peak	Base + Dev (in s) PM Peak	Change (in s) AM Peak	Change (in s) PM Peak
6	Melbourne Street	7.56	0.00	7.55	10.59	-0.01	+10.59

13.102. The results show a change in delay of less than 30 seconds during the AM and PM peaks; therefore, the magnitude of the effect is negligible.

13.103. The significance of the effect is therefore minor adverse in the long-term (permanent), at a local level which is not significant.

Public Transport Users

13.104. There are currently no bus services that utilise Link 6 – Melbourne Street; hence, there would be no impacts on public transport users.

Pedestrian Delay

13.105. 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. The Melbourne Street link has been assessed and the results are shown below:

Table 13.15 – Pedestrian Delay – Change in Pedestrian Delay

No.	Link Description	Base (in s) AM Peak	Base (in s) PM Peak	Base + Dev (in s) AM Peak	Base + Dev (in s) PM Peak	Change (in s) AM Peak	Change (in s) PM Peak
6	Melbourne Street	0.17	0.02	0.16	0.50	-0.01	+0.48

13.106. The results show a change in delay of less than 1 second during the AM and PM peaks; therefore, the magnitude of the effect is imperceptible, resulting in no change to the existing conditions. The significance of the effect is therefore neutral in the long-term (permanent), at a local level which is not significant.

Pedestrian Amenity

13.107. Changes in amenity to pedestrians considers the IEMA Guidelines, 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%. The Melbourne Street link has been assessed for change in total vehicle flow in the above tables, and the results for change in HGV traffic flows are shown below.

13.108. The results in the earlier tables show an increase in traffic flows of over 50%; however, the

overall number of vehicles travelling along Melbourne Street would still be very low. For instance, during the AM peak there would be one car travelling along Melbourne Street in any direction every three minutes and approximately one vehicle every minute in the PM peak. As outlined above, the percentage change in traffic flows on this link are high due to the low baseline traffic flows along this link.

13.109. Furthermore, the existing provision for pedestrians along Melbourne Street is good with wide footways along both sides of the carriageway.

13.110. On this basis, the magnitude of the effect is considered to be negligible. As such, the significance of the effect is therefore minor adverse in the long-term (permanent), at a local level which is not significant.

Fear and Intimidation

13.111. The assessment of fear and intimidation considers the potential change in the degree of hazard. The Melbourne Street link has been assessed and the results are shown below:

Table 13.16 – Fear and Intimidation – Change in Degree of Hazard

Link		Base			Base + Dev			Change		
No.	**Description**	**18 Hour AAWT (veh/h)**	**18 Hour HGV Flow (veh/h)**	**Avg. speed (mph)**	**18 Hour AAWT (veh/h)**	**18 Hour HGV Flow (veh/h)**	**Avg. speed (mph)**	**18 Hour AAWT (veh/h)**	**18 Hour HGV Flow (veh/h)**	**Avg. speed (mph)**
6	Melbourne Street	7 Hazard: N/A	0 Hazard: N/A	20	8 Hazard: N/A	0 Hazard: N/A	20	+1 Hazard: N/A	0 Hazard: N/A	20

13.112. The results show no change in the degree of hazard; therefore, the magnitude of the impact is negligible. The significance of the effect is therefore neutral in the long-term (permanent), at a local level which is not significant.

Severance

13.113. The assessment of severance has been undertaken at link level and considers the potential change in traffic flows. The Melbourne Street link has been assessed and the results are shown below:

Table 13.17 – Severance – Change in Traffic Flows

Link		Base			Base + Dev			% Change		
No.	**Description**	**AM Peak**	**PM Peak**	**24h AADT**	**AM Peak**	**PM Peak**	**24h AADT**	**AM Peak**	**PM Peak**	**24h AADT**
6	Melbourne Street	24	3	140	22	70	424	-6.81%	**2221.22%**	**203.29%**

13.114. The results show an increase in traffic flows of over 90%, therefore the magnitude of the effect is major. However, an analysis of the overall number of vehicles travelling along Melbourne

Street shows that this number would still be very low. For instance, during the AM peak there would be one car travelling along Melbourne Street in any direction every three minutes and approximately one vehicle every minute in the PM peak. On this basis, and despite a high percentage increase, the overall number of vehicles travelling along Melbourne Street during the operation of the Proposed Development is very low and would not create severance.

13.115. On this basis, the magnitude of the effect is considered to be negligible. As such, the significance of the effect is therefore **slight adverse** in the long-term (permanent), at a local level which is **not significant**.

Collisions and Road Safety

13.116. The assessment of collisions and road safety considers both the collision record and the change in traffic flows.

13.117. 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.

13.118. On this basis, there would be no perceptible change in collisions. The significance of the effect is therefore neutral in the long-term (permanent), at a local level which is not significant.

Mitigation Measures

13.119. As previously identified, the construction phase is likely to have a direct, temporary, short-term (reversible), **neutral** effect at a local level, which is **not significant**. Mitigation measures are therefore not deemed necessary.

13.120. Notwithstanding, a Construction Environmental Management Plan (CEMP) will be provided with various measures that promote travel planning, considerate construction practices and agree traffic management measures.

13.121. 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. Mitigation measures are therefore not deemed necessary based on this Chapter of the ES.

13.122. Notwithstanding, the Proposed Development will deliver benefits to the local area through improved public realm, and pedestrian and cycle facilities.

13.123. 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 Proposed Development and encourage residents to use sustainable modes of transport. A range of initiatives are detailed in the FTP that will help to mitigate the impacts of the traffic associated with the Proposed Development and encourage active and sustainable travel. These initiatives comprise the appointment of a Travel Plan Coordinator, production of residential Welcome Packs, measures to encourage walking, cycling and public transport, and car sharing.

Cumulative Effects

13.124. In order to assess the cumulative effects of development in the study area, an additional assessment scenario has been considered, as follows:

- Cumulative = 2028 Baseline + Proposed Development (both phases) + All Committed Developments (includes additional committed developments to the Crown Street Phase 2 TA).

13.125. This scenario includes additional committed developments comprising Crown Street Phase 2's school (application reference: 126668/FO/2020), and Transition (application reference: 116850/FO/2017).

13.126. The percentage changes as a result of the Proposed Development, relative to the Cumulative assessment flows, would not result in any further links for assessment relative to the 30% assessment threshold. In fact, the percentage impact of the Proposed Development would reduce on all links in the study area.

13.127. The operational phase assessment presented above therefore provides a robust position and worst case assessment for the impact of the Proposed Development on the local highway network.

Residual Effects

13.128. 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.

13.129. The construction phase is likely to have a direct, temporary, short-term (reversible), **minor adverse** effect at a local level for the following, which is **not significant**. Notwithstanding, it is considered appropriate to provide a CEMP with various measures that promote travel planning, considerate construction practices and agree traffic management measures.

13.130. Following the implementation of these measures, the impacts of the construction phase would remain as **minor adverse** and **not significant**.

13.131. 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**. Notwithstanding, the Proposed Development will deliver benefits to the local area through improved public realm, and pedestrian and cycle facilities. The Site will also be supported by an FTP to encourage residents to use sustainable modes of transport and thereby minimise the traffic impacts of the Proposed Development.

13.132. Following the implementation of these measures, the impacts of the operational phase would remain as **neutral** to **minor adverse** and **not significant**.

Reference List

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

- Ministry of Housing, Communities & Local Government, (2019). '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, (2020). 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.;
- Transport for Greater Manchester, (2021). 'Greater Manchester Transport Strategy 2040'. Available at: https://tfgm.com/2040;
- Manchester Residential Quality Guidance (2016). Available at: https://secure.manchester.gov.uk/downloads/download/6682/residential_quality_guide ;
- Great Jackson Street Development Framework (2018). Available at: https://secure.manchester.gov.uk/downloads/file/26044/great_jackson_street_srf_may_2018
- Institute of Environmental Management and Assessment, (1993). 'Guidelines for the Environmental Assessment of Road Traffic'. IEMA, East Kirkby;
- The Chartered Institution of Highways & Transportation, (2000). 'Guidelines for Providing for Journeys on Foot'. IHT, London;
- Cycling England, (2008). 'Integrating Cycling into Development Proposals'. Available at: https://www.cycling-embassy.org.uk/document/c07-integrating-cycling-development-proposals.
- The Chartered Institution of Highways & Transportation, (2018). 'Buses in Urban Developments'. Available at: https://www.ciht.org.uk/media/4459/buses_ua_tp_full_version_v5.pdf; and
- Highways England, (2020). Design Manual for Roads and Bridges. Available at: https://www.standardsforhighways.co.uk/dmrb/.

14. Wind Microclimate

Introduction

14.1. This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to Wind Microclimate. 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 negative effects; and the likely residual effects after these measures have been adopted.

14.2. The authors of this Chapter are Stefano Cammelli (Technical Director – Wind Engineering at WSP) and Elvin Hii (Senior Engineer – Wind Engineering at WSP). Stefano is a wind engineering specialist with 18 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.

14.3. Stefano is a Fellow of the Institute of Civil Engineers and the current Vice-Chair of the UK Wind Engineering Society. Elvin is a wind engineering specialist with 6 years' experience in the wind engineering industry, during which he has been responsible for the delivery of many consultancy projects worldwide. He has been an active participant of local and international wind engineering conferences and has co-authored several technical publications. Elvin is an Associate Member of the Institution of Mechanical Engineers and a Member of the UK Wind Engineering Society.

14.4. This Chapter is intended to be read along with the following Appendices:

- Appendix 14.1 – Wind Microclimate Technical Report

Legislative and Policy Context

Legislation

14.5. There is no specific national legislation or planning policy guidance dealing with wind microclimate in terms of pedestrian comfort. However, the Lawson Criteria[76] - which are used to benchmark the pedestrian wind microclimate - are well-established in the UK.

Local Planning Policy

14.6. Manchester's Local Development Framework – Core Strategy Development Plan[77] 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.

14.7. 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.

[76] Lawson, T.V., "Building Aerodynamics". Imperial College Press, 2001.
[77] secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027.

14.8. '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."

Assessment Methodology and Significance Criteria

Defining the Baseline

14.9. An assessment of the baseline conditions has been carried out as part of the wind microclimate assessment. For the purpose of the wind microclimate assessment, the existing baseline conditions have been assumed to be the area within the Site boundary and the existing properties surrounding the Site which might be affected by the Proposed Development. The baseline model as shown in Figure 14.1 (Appendix 14.1) includes the existing Site and all the existing buildings within an approximate 500m radius of the Site.

14.10. Results of the assessment of the baseline conditions are presented in Section 3 of the Wind Microclimate Technical Report (Appendix 14.1) and are also discussed in Paragraphs 14.31 to 14.33 further on in this document.

Impact Assessment Methodology

Enabling and Construction

14.11. A quantified assessment of the impacts of the Proposed Development during enabling and construction has not been included in this ES Chapter. This is because wind effects at pedestrian level are closely associated with the size and shape of the massing of buildings and during the enabling and construction stage this condition will be continuously changing. Therefore, during the enabling and construction stages the effects will be both varying and temporary. However, using professional experience, a qualitative assessment has been undertaken and is included in the Identification and Evaluation of Significant Effects section.

14.12. Cranes will be used on-site during construction; however, it can be noted that these are typically slender and relatively "open" structures. They would therefore not be expected to introduce any material microclimate effects to the Site or surrounding area that would require assessment in this ES.

Completed Development

14.13. 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.

14.14. 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[78].

14.15. The results presented within this ES Chapter make use of the wind statistics obtained from the meteorological station at Manchester Airport, corrected for the Site (accounting for upwind terrain and reference height at the Site), to determine the probability of local wind speeds exceeding comfort and safety thresholds for a range of common pedestrian activities.

14.16. The phasing sequence for the Proposed Development has been defined as:

- Phase A – Tower F2
- Phase B – Tower F1

14.17. The assessment of the wind microclimate impacts comprised the following five (5) scenarios:

- Scenario 1: Baseline
- Scenario 2: Phase A, including highways and part of the public realm
- Scenario 3: Scenario 2 + Committed Developments
- Scenario 4: Phases A and B, including highways and public realm
- Scenario 5: Scenario 4 + Committed Developments

14.18. A list of the cumulative schemes assessed within the study area of the wind assessment is provided later in this ES Chapter.

Assessment Criteria

14.19. 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 to a threshold wind speed and a threshold frequency to the suitability of an activity.

14.20. 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.

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.

[78] www.cityoflondon.gov.uk/assets/Services-Environment/wind-microclimate-guidelines.pdf.

Comfort category	Wind speeds not to be exceeded by more than 5% of the time	Description
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.

14.21. 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 14.2 – LDDC Lawson Criteria for Pedestrian Safety

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.

Wind Climate Analysis

14.22. The wind frequency statistics applied in this assessment were based on data obtained from the meteorological station at Manchester Airport and corrected for the Site. A detailed description of the wind climate analysis has been included in Section 2.4 of the Wind Microclimate Technical Report (Appendix 14.1).

Limitations and Assumptions

14.23. The following assumptions and limitations have been made when completing this ES Chapter:

- The models and calculations for the wind assessment have been based on the drawings and models of proposed and existing properties provided by the project design team and supplemented with the available satellite images of the existing surroundings.
- The LDDC Lawson Criteria for 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, off-site cumulative landscaping schemes were not explicitly modelled in the CFD simulations.
- The wind study focused on pedestrian level wind environment and excluded façade pressure, wind loads, inputs to structural engineering; internal airflows within buildings or impacts on vehicles or waterways.

Methodology for Defining Effects

Reporting of the Environmental Effect and Significance Criteria

14.24. 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

14.25. The wind microclimate conditions of on-site receptors introduced as part of the Proposed Development has been assessed on the basis of 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

14.26. 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.

Categorising Likely Significant Effects

14.27. 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.

14.28. For off-site receptors, a major adverse effect is a 'significant effect' because it implies that a location, or area, which was previously suitable in terms of pedestrian comfort and / or safety, has become unsuitable for the desired use of that area. On this basis, only off site effects that are major adverse need mitigating.

14.29. Beneficial effects that are moderate or major in scale are not considered to be 'significant' or a material consideration for planning, as they result in an improvement in the local wind environment.

Receptors and Receptor Sensitivity

14.30. 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 14.2 to Figure 14.6 (Appendix 14.1). The full list of receptors is included in Table 14.5.

Table 14.5 – List of Receptors for The Assessment

Receptor number	Description	Use	On-Site / Off-Site
1	Main entrance to F2	Entrance	On-Site
2	GF private garden (F2)	Outdoor seating	On-Site

Receptor number	Description	Use	On-Site / Off-Site
3	GF private garden (F2)	Outdoor seating	On-Site
4	Walkway to the east of F2	Thoroughfare	On-Site
5	Walkway to the south of F2	Thoroughfare	On-Site
6	Amenity area (F2)	Recreational space	On-Site
7	Seating area (F2)	Outdoor seating	On-Site
8	Drop-off	Waiting area	On-Site
9	Walkway between F1 and F2	Thoroughfare	On-Site
10	Amenity area (F1)	Recreational space	On-Site
11	Main entrance to F1	Entrance	On-Site
12	GF private garden (F1)	Outdoor seating	On-Site
13	Walkway to the west of F1	Thoroughfare	On-Site
14	Walkway to the south of F1	Thoroughfare	On-Site
15	Entrance (Boatmans)	Entrance	Off-Site (existing)
16	Entrance (The Rhine)	Entrance	Off-Site (existing)
17	Courtyard (Lumiere)	Recreational space	Off-Site (existing)
18	Entrance (Lumiere)	Entrance	Off-Site (existing)
19	Entrance (Medlock Place)	Entrance	Off-Site (existing)
20	Entrance (City South)	Entrance	Off-Site (existing)
21	Courtyard (City South)	Recreational space	Off-Site (existing)
22	Pavement (Garwood St. / City Rd. East)	Thoroughfare	Off-Site (existing)
23	Pavement (Garwood St. / River St.)	Thoroughfare	Off-Site (existing)
24	Entrance (River Street Tower)	Entrance	Off-Site (existing)

Receptor number	Description	Use	On-Site / Off-Site
25	Pavement (Great Jackson St.)	Thoroughfare	Off-Site (existing)
26	Pavement (Great Jackson St.)	Thoroughfare	Off-Site (existing)
27	Pavement (Great Jackson St.)	Thoroughfare	Off-Site (existing, baseline only)
28	Pavement (Great Jackson St.)	Thoroughfare	Off-Site (existing)
29	Pavement (Owen St.)	Thoroughfare	Off-Site (existing)
30	Pavement (Owen St.)	Thoroughfare	Off-Site (existing)
31	Entrance (Deansgate Sq.)	Entrance	Off-Site (existing)
32	Pavement (Owen St.)	Thoroughfare	Off-Site (existing)
33	Pavement (Owen St. / Pond St.)	Thoroughfare	Off-Site (existing)
34	Pavement (Pond St.)	Thoroughfare	Off-Site (existing)
35	Amenity area (Deansgate Sq.)	Recreational space	Off-Site (existing)
36	Entrance (Deansgate Sq.)	Entrance	Off-Site (existing)
37	Amenity area (Deansgate Sq.)	Recreational space	Off-Site (existing)
38	Entrance (Deansgate Sq., North Tower)	Entrance	Off-Site (existing)
39	Pavement (City Rd. East / Shortcroft St.)	Thoroughfare	Off-Site (cumulative)
40	Pavement (Great Jackson St. / Garwood St.)	Thoroughfare	Off-Site (cumulative)
41	Entrance (Plot G)	Entrance	Off-Site (cumulative)
42	Entrance (Plot G)	Entrance	Off-Site (cumulative)
43	Pavement (south of the Transition)	Thoroughfare	Off-Site (cumulative)

Receptor number	Description	Use	On-Site / Off-Site
44	Pavement (east of the Transition)	Thoroughfare	Off-Site (cumulative)
45	Entrance (Transition)	Entrance	Off-Site (cumulative)
46	Entrance (Transition)	Entrance	Off-Site (cumulative)
47	Entrance (Transition)	Entrance	Off-Site (cumulative)

Baseline Conditions

14.31. 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).

Pedestrian Safety Assessment

14.32. In the Baseline scenario, no exceedances of the pedestrian safety criteria occur.

Pedestrian Comfort Assessment

14.33. In the Baseline scenario, wind *comfort* ratings across the majority of the receptors are suitable for the intended pedestrian uses. Exceedances of the pedestrian comfort criteria occur at receptors 16 (entrance – The Rhine), 20 (entrance – City South), 31 (Deansgate Square) and 38 (Deansgate Square North Tower).

Identification and Evaluation of Significant Effects

Demolition and Construction

14.34. A quantified assessment of the impacts of the Proposed Development scheme during demolition and construction has not been included in this Chapter to the ES. This is because wind effects at pedestrian level are closely associated with the size and shape of the massing of buildings and during the demolition and construction stage this condition will be continuously changing. However, from professional judgement, it can be stated that as demolition and construction works progress, the conditions on and around the Site would be expected to gradually transition between those of the baseline and the final completed Proposed Development. Therefore, any effects on pedestrians arising from changes in the local wind environment as a result of progressive changes to the massing of the built form on-site during the demolition and construction works are expected to be temporary.

14.35. The potential effects during various stages of construction will vary and are likely to be of lesser magnitude than those that will be experienced once the Proposed Development has been completed. Additionally, demolition and enabling activities are less sensitive to wind conditions and a Construction Environment Management Plan (CEMP) would be used to protect construction workers. Access to the Site will also be restricted via perimeter hoardings. The presence of cranes on-site is unlikely to present a significant impact on wind conditions at the Site due to the typical open-truss type construction of the frame used, which is relatively 'transparent' to wind and thus unlikely to generate downdrafts. Any undesirable wind conditions

during construction are temporary and as construction of the Proposed Development proceeds, the wind conditions at the Site would gradually vary, approaching those of the completed Proposed Development, the assessment of which is covered in the next section. The demolition and construction effects are not discussed further in this Chapter to the ES.

Completed Development (Phase A only – Scenario 4)

14.36. The completed Proposed Development has been modelled to represent the conditions in and around the Site within the existing context, with the introduction of the completed Phase A of the Proposed Development. The results are discussed below and further detail of the quantification of the results is provided in Section 4 of the Wind Microclimate Technical Report (Appendix 14.1). The 3D model of the completed Proposed Development in the context of the existing surroundings is shown in Figure 14.7 below.

Pedestrian Safety Assessment

14.37. With the introduction of the Proposed Development (Phase A), no exceedances of the pedestrian *safety* criteria occur. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

14.38. With the introduction of the Proposed Development (Phase A), wind comfort ratings across many of the receptors are suitable for the intended pedestrian uses. Inherent exceedances of the pedestrian comfort criteria from the Baseline configuration persist. The nature and scale of the effects range between **Moderate Adverse** (Off-Site) and **Moderate Beneficial** and are therefore considered **Not Significant**.

14.39. At receptors 2 (private garden, F2) and 6 (amenity area, F2) within the Site of the Proposed Development, wind conditions in summer are suitable for standing/short periods of sitting. Given the active nature of typical pedestrian activities expected within these areas, the wind comfort ratings at these receptors are considered suitable for this use. The nature and scale of the effects are therefore **Negligible** and are considered **Not Significant**.

Completed Development (Phase A and B – Scenario 5)

14.40. The completed Proposed Development has been modelled to represent the conditions in and around the Site within the existing context, with the introduction of the completed Phase A and B of the Proposed Development. The results are discussed below and further detail of the quantification of the results is provided in Section 6 of the Wind Microclimate Technical Report (Appendix 14.1). The 3D model of the completed Proposed Development in the context of the existing surroundings is shown in Figure 14.8.

Pedestrian Safety Assessment

14.41. With the introduction of the Proposed Development (Phase A and B), no exceedances of the pedestrian *safety* criteria occur. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

14.42. With the introduction of the Proposed Development (Phase A and B), wind *comfort* ratings across the majority of the receptors are suitable for the intended pedestrian uses. Inherent exceedances of the pedestrian comfort criteria from the Baseline configuration persist. The

nature and scale of the effects range between **Moderate Adverse** (Off-Site) and **Moderate Beneficial** and are therefore considered **Not Significant**.

14.43. At receptors 2 (private garden, F2), 6 (amenity area, F2) and 10 (amenity area, F1) within the Site of the Proposed Development, wind conditions in summer are suitable for standing/short periods of sitting. Given the active nature of typical pedestrian activities expected within these areas, the wind comfort ratings at these receptors are considered suitable for this use. The nature and scale of the effects are therefore **Negligible** and are considered **Not Significant**.

Mitigation Measures

14.44. As detailed in Sections 4, 5, 6 and 7 of the Wind Microclimate Technical Report (Appendix 14.1), in addition to the proposed landscaping scheme (*F1-TPM-G710-PL-XX-3851 101 FINAL)*, the following wind mitigation measures were included in the assessment:

- 1 unit of 1.5m (H) evergreen hedging near the south corner of F2.
- 3 units of 1.5m (W) × 2.5m (H) 50% porous screens close to the eastern corner of F1.
- 2 units of 1.5m (H) evergreen hedging either side of the main entrance of F1.

Cumulative Effects

14.45. In the cumulative assessment, the following cumulative schemes within a 500m radius of the Site were modelled based on information from the design team and that is publicly available:

- 10-12 Whitworth Street – 111003/FO/2016/C1
- Plot H, Great Jackson Street Framework – 129406/FO/2021
- Transition – 116850/FO/2017
- 1 Alpha Place – 120113/FO/2018
- Plot 9, First Street – 125833/FO/2019
- Plot 11, First Street – 125573/FO/2019
- 325 Deansgate – 125804/FO/2019
- Hotspur Press – 120635/FO/2018
- One City Road – 128002/FO/2020
- Plot G, 34 Great Jackson Street – 129273/FO/2021
- 2-4 Whitworth Street – 126308/FO/2020

Cumulative Assessment (Phase A only – Scenario 4)

14.46. In this scenario, the completed Phase A of the Proposed Development has been modelled to represent the conditions in and around the Site within the context of existing and cumulative surroundings. The results are discussed below and further detail of the quantification of the results is provided in Section 5 of the Wind Microclimate Technical Report (Appendix 14.1).

Pedestrian Safety Assessment

14.47. With the introduction of the cumulative surroundings, no exceedances of the pedestrian *safety* criteria occur. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

14.48. With the introduction of the cumulative surroundings, wind *comfort* ratings across the majority of the receptors are suitable for the intended pedestrian uses. The nature and scale of the effects at these receptors range between **Moderate Adverse** (Off-Site) and **Moderate Beneficial** and are therefore considered **Not Significant**.

14.49. At receptors 2 (private garden, F2) and 6 (amenity area, F2) within the Site of the Proposed Development, wind conditions in summer are suitable for standing/short periods of sitting. Given the active nature of typical pedestrian activities expected within these areas, the wind comfort ratings at these receptors are considered suitable for this use. The nature and scale of the effects are therefore **Negligible** and are considered **Not Significant**.

14.50. An exceedance of the pedestrian comfort criteria occurs at receptor 45 (entrance to the 'Transition' development), where wind conditions are rated as unsuitable for pedestrian ingress/egress activity. However, a review of the wind microclimate study conducted as part of the planning application of the 'Transition' development (Ref. 116850/FO/2017) revealed that - in the absence of the landscaping strategy / wind mitigation measures pertaining to this specific development - wind conditions at this particular location were not meeting the comfort rating required for an entrance.

14.51. As the landscaping strategy / wind mitigation measures pertaining to the approved 'Transition' development were not (conservatively) explicitly modelled in the CFD simulations conducted in support of this Chapter, it can be concluded that this exceedance of the comfort criteria is not driven by the Proposed Development. It should be noted that, if the landscaping strategy / wind mitigation part of the 'Transition' development were explicitly modelled as part of the CFD simulations conducted in support of this Chapter, we would expect the identified off-site exceedance to reduce and become consistent with the residual effects identified by the wind microclimate report submitted as part of the planning application of the 'Transition' development. In the context of the Proposed Development, the nature and scale of the effect is therefore considered to be **Negligible** (Off-Site) and **Not Significant**.

Cumulative Assessment (Phase A and B)

14.52. In this scenario, the completed Phase A and B of the Proposed Development have been modelled to represent the conditions in and around the Site within the context of existing and cumulative surroundings. The results are discussed below and further detail of the quantification of the results is provided in Section 7 of the Wind Microclimate Technical Report (Appendix 14.1).

Pedestrian Safety Assessment

14.53. With the introduction of the cumulative surroundings, no exceedances of the pedestrian safety criteria occur. The nature and scale of the effects are **Negligible** and are therefore considered **Not Significant**.

Pedestrian Comfort Assessment

14.54. With the introduction of the cumulative surroundings, wind comfort ratings across many of the receptors are suitable for the intended pedestrian uses. The nature and scale of the effects at these receptors range between **Moderate Adverse** (Off-Site) and **Moderate Beneficial** and are therefore considered **Not Significant**.

14.55. At receptors 2 (private garden, F2), 6 (amenity area, F2) and 10 (amenity area, F1) within the Site of the Proposed Development, wind conditions in summer are suitable for standing/short periods of sitting. Given the active nature of typical pedestrian activities expected within these areas, the wind comfort ratings at these receptors are considered suitable for this use. The nature and scale of the effects are therefore **Negligible** and are considered **Not Significant**.

14.56. At receptor 7 (seating area, F2), wind conditions across the seating area are suitable – in terms of wind comfort – for sitting/standing in the summer months and are therefore in part suitable for short periods of sitting and in part suitable for more prolonged periods of sitting. As the wind conditions across this area is generally suitable for the intended range of activities, the nature and scale of the effects are considered **Negligible** and **Not Significant**.

14.57. An exceedance of the pedestrian comfort criteria occurs at receptor 45 (entrance to the 'Transition' development), where wind conditions are rated as unsuitable for pedestrian ingress/egress activity. However, a review of the wind microclimate study conducted as part of the planning application of the 'Transition' development (Ref. 116850/FO/2017) revealed that - in the absence of the landscaping strategy / wind mitigation measures pertaining to this specific development - wind conditions at this particular location were not meeting the comfort rating required for an entrance. As the landscaping strategy / wind mitigation measures pertaining to the approved 'Transition' development were not (conservatively) explicitly modelled in the CFD simulations conducted in support of this Chapter, it can be concluded that this exceedance of the comfort criteria is not driven by the Proposed Development. It should be noted that, if the landscaping strategy / wind mitigation part of the 'Transition' development were explicitly modelled as part of the CFD simulations conducted in support of this Chapter, we would expect the identified off-site exceedance to reduce and become consistent with the residual effects identified by the wind microclimate report submitted as part of the planning application of the 'Transition' development. In the context of the Proposed Development, the nature and scale of the effect is therefore considered to be **Negligible** (Off-Site) and **Not Significant**.

Residual Effects

14.58. The completed Proposed Development (Phase A only) with existing surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between **Moderate Adverse** (Off-Site Receptors) and **Moderate Beneficial** and are **Not Significant**.

14.59. The completed Proposed Development (Phase A and B) with existing surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between **Moderate Adverse** (Off-Site Receptors) and **Moderate Beneficial** and are **Not Significant**.

14.60. The completed Proposed Development (Phase A only) with cumulative surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between **Moderate Adverse** (Off-Site Receptors) and **Moderate Beneficial** and are **Not Significant**.

14.61. The completed Proposed Development (Phase A and B) with cumulative surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between **Moderate Adverse** (Off-Site Receptors) and **Moderate Beneficial** and are **Not Significant**.

Table 14.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Negligible	-	None	Negligible
Operational Phase			
Major Adverse	'Receptor 5'	1 unit of 1.5m (H) evergreen hedging near the south corner of F2	Negligible
Major Adverse	'Receptor 11'	3 units of 1.5m (W) × 2.5m (H) 50% porous screens close to the eastern corner of F1 and 2 units of 1.5m (H) evergreen hedging either side of the main entrance of F1	Negligible
Ranging between Moderate Adverse to Moderate Beneficial	All other receptors	None specifically	Ranging between Moderate Adverse to Moderate Beneficial

Summary

14.62. The results of the assessment, including the wind mitigation features incorporated in the design, indicate that the Proposed Development is likely to modify the local wind environment and create both improvements as well as some localised areas where accelerated winds could prevail.

14.63. Wind conditions within and in the vicinity of the Proposed Development are free from breaches of the safety criterion and wind comfort ratings are suitable for the intended pedestrian uses.

14.64. In this assessment, it has also been observed that wind conditions at one of the entrances to the 'Transition' development exceed the wind speed threshold for standing in most seasons, therefore precluding comfortable ingress/egress. However, a review of the wind microclimate study conducted as part of the planning application of the 'Transition' development (Ref. 116850/FO/2017) revealed that - in the absence of the landscaping strategy / wind mitigation measures pertaining to this specific development - wind conditions at this particular location were not meeting the comfort rating required for an entrance.

14.65. As the landscaping strategy / wind mitigation measures pertaining to the approved 'Transition' development were not (conservatively) explicitly modelled in the CFD simulations conducted in support of this Chapter, it can be concluded that this exceedance of the comfort criteria is not caused by the Proposed Development.

14.66. Following the completion of the CFD-based wind microclimate assessment presented within this Chapter, a design change was made to the podium for Tower F1. The original massing featured a rectangular block parallel to the west face of the building. The updated design extends the original rectangular block and introduces an offset angle. Figure 14.9 illustrates the original massing (left) next to the updated geometry (right), with the modification shown in red. It should be noted that the overall height of the podium remains unchanged.

14.67. The impact of the design change illustrated in Figure 14.9 on the wind microclimate conditions in the immediate vicinity of Tower F1 is expected to be relatively localised and negligible. We would therefore expect the conclusions of this Chapter to remain valid.

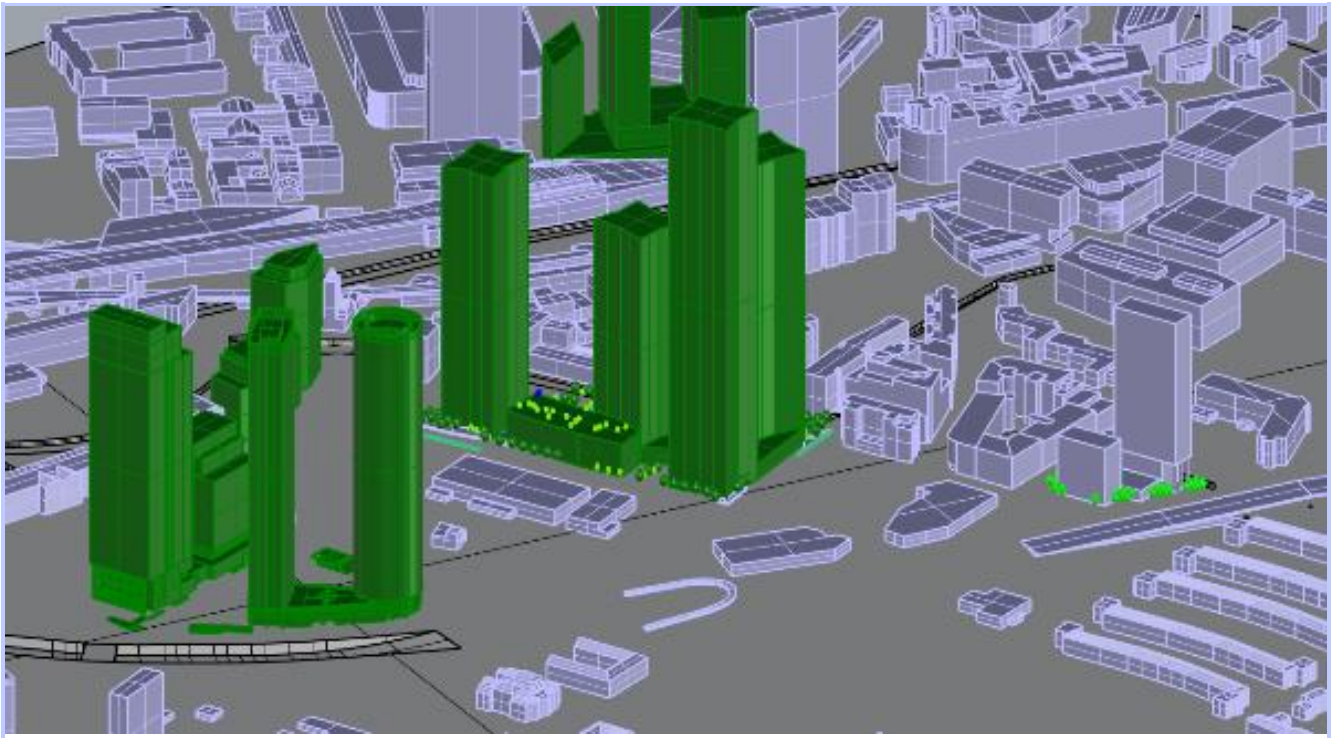


Figure:	14.1		
Title:	Baseline Model		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A



Figure:	14.2		
Title:	Receptors for Assessment – Scenario 1		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

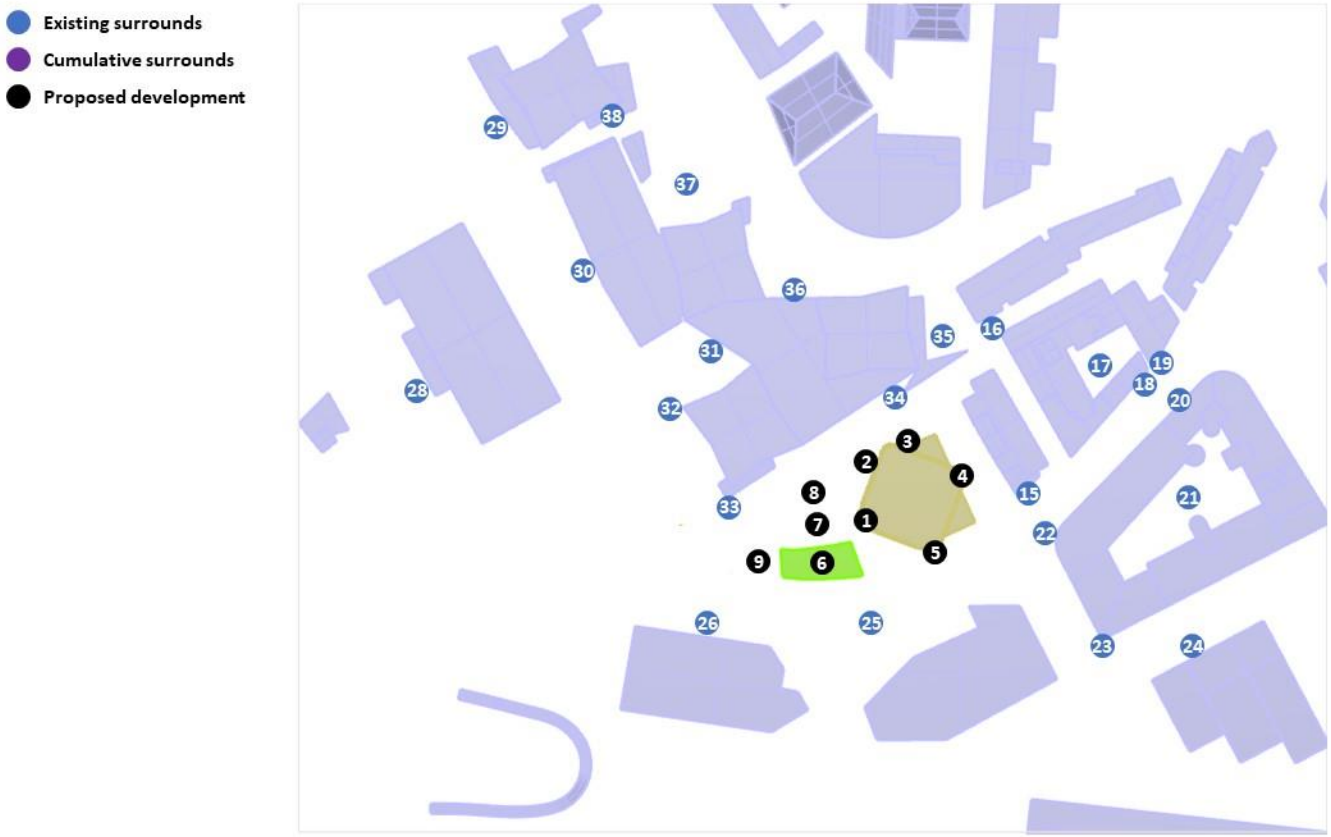


Figure:	Figure 14.3		
Title:	Receptors for Assessment – Scenario 2		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

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Figure:	Figure 14.4		
Title:	Receptors for Assessment – Scenario 3		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

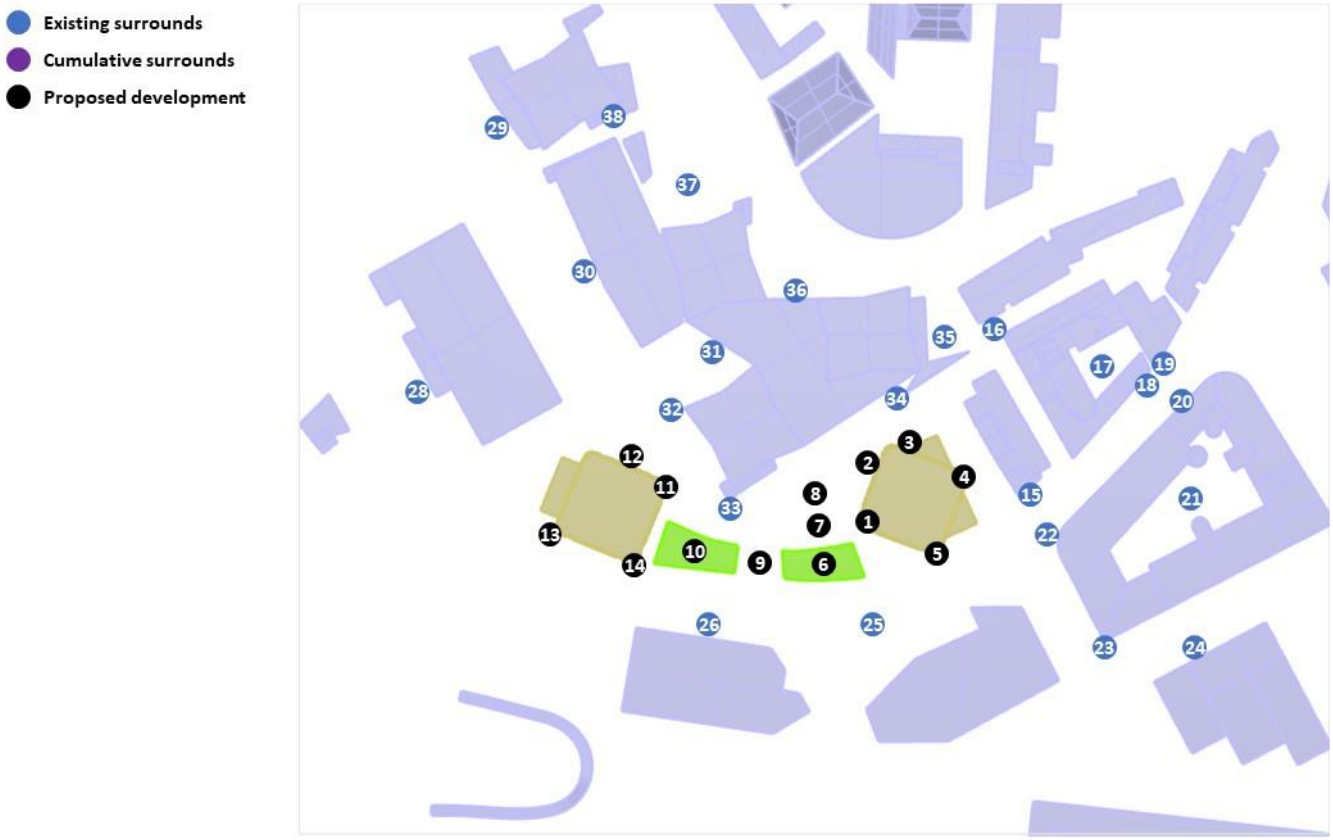


Figure:	Figure 14.5		
Title:	Receptors for Assessment – Scenario 4		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A



Figure:	Figure 14.6		
Title:	Receptors for Assessment – Scenario 5		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

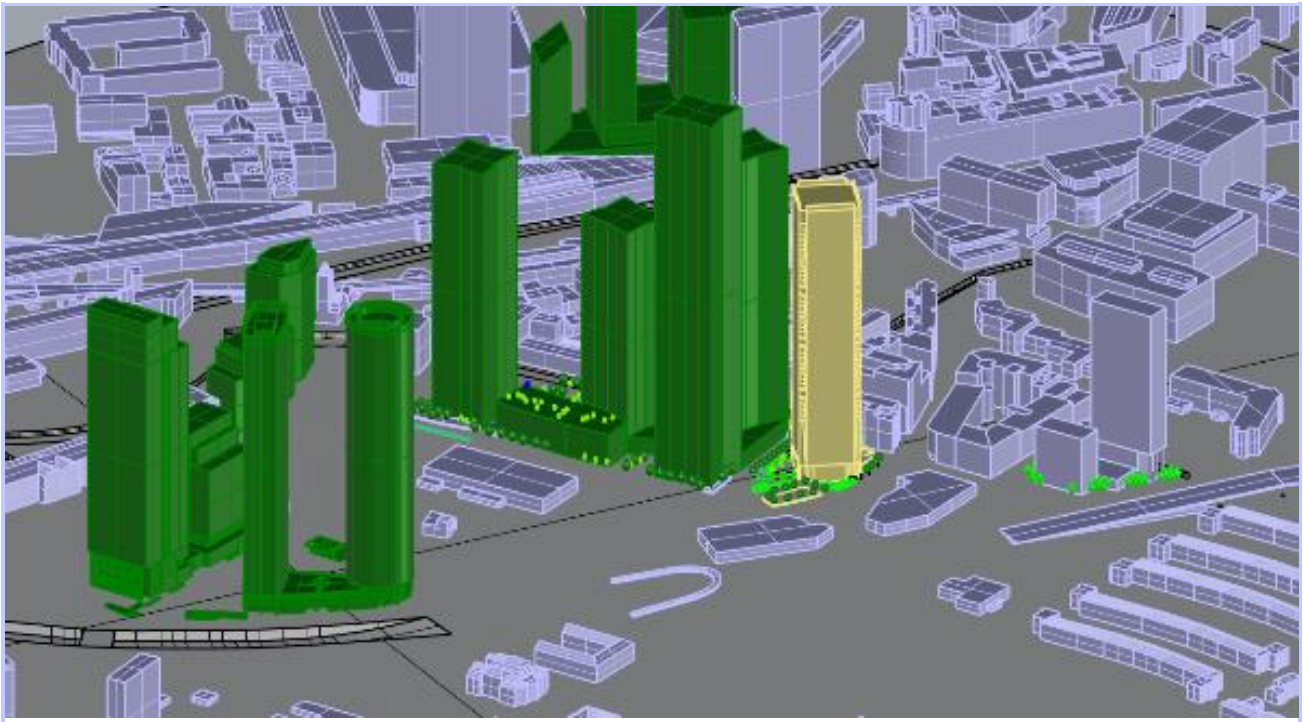


Figure:	Figure 14.7		
Title:	View of the Completed Development (Phase A)		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

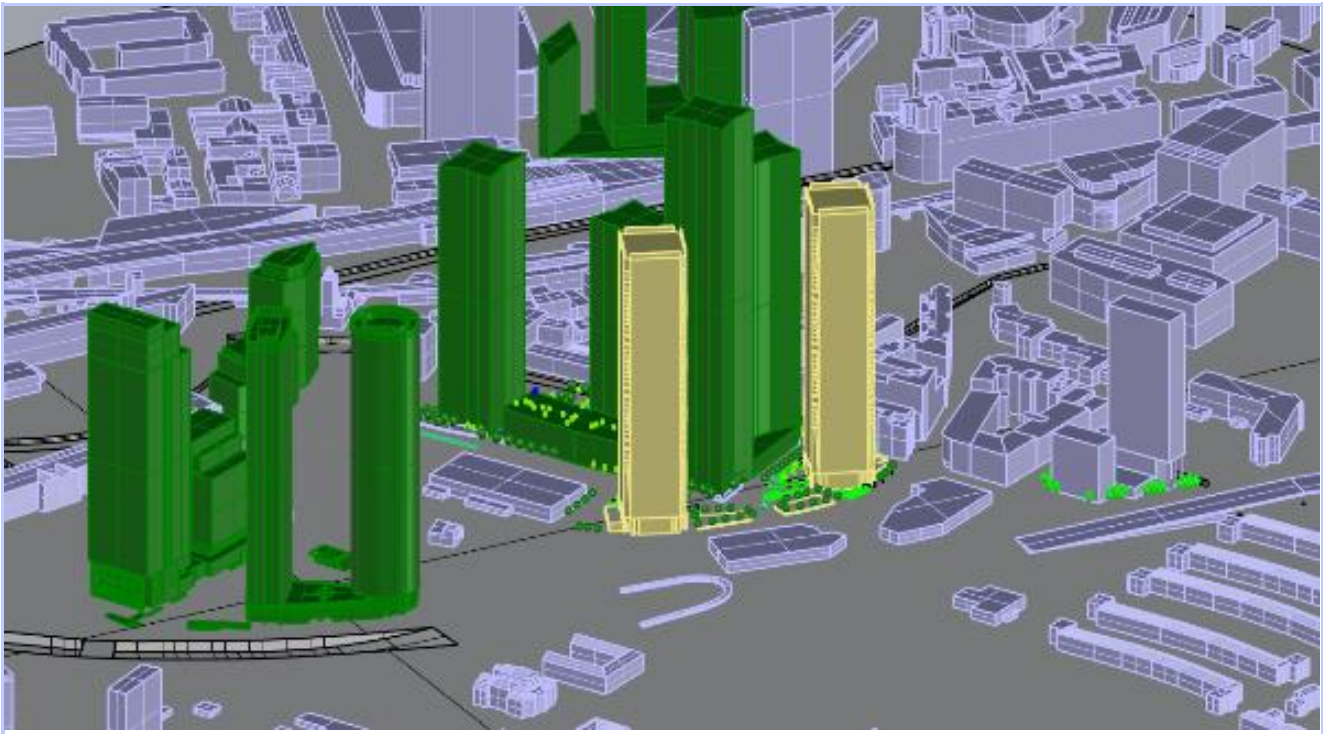


Figure:	Figure 14.8		
Title:	View of the Completed Development (Phase A and B)		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

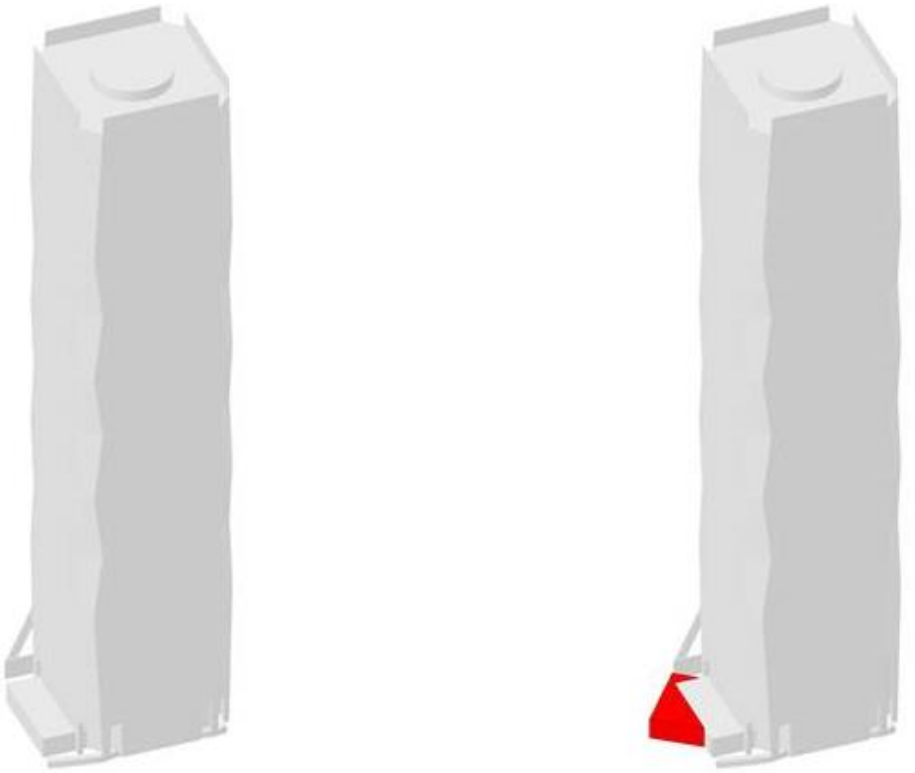


Figure:	Figure 14.9		
Title:	Illustration of the Change to the Podium of F1		
Project:	Great Jackson Street Plot F		
Date:	26/10/2021	Scale:	N/A

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 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.

15.2. It includes an assessment of the policy context in which investment will be delivered, consideration of baseline conditions, methods used to assess the impacts, review of local service provision and the potential effects of the Proposed Development during both its construction and operational phases.

15.3. This chapter has been prepared by ekosgen, economic, social and regeneration specialists, with significant experience conducting socio-economic impact assessments, profiling local economies and sectors and assessing the impacts to be secured as a result of a variety of investment proposals, including schemes designed to unlock both residential and employment sites.

15.4. This Chapter is accompanied by one technical appendix, containing socio-economic baseline data (Appendix 15.1 – Socio-economic data tables).

Policy Context

15.5. This section identifies the national, sub-regional and local planning documents and policies of relevance to this socio-economic impact assessment.

National Planning Policy

National Planning Policy Framework (NPPF)

15.6. Last published by Government in July 2021, the NPPF acknowledges that there are three components to sustainable development: economic, social and environmental:

- Economic: "*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*"
- Social: "*to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being*"
- Environmental: "*contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*"

15.7. The document recognises that there is a need to create conditions in which businesses can invest, expand and adapt. There should be significant focus placed on supporting economic growth and productivity while taking account of local business needs and wider opportunities for development.

Sub-Regional Planning Policy

Places for Everyone Plan

15.8. A new draft spatial framework for nine of Greater Manchester's local authorities,[79] not yet adopted, has been published setting out the direction of travel for development across the sub-region. 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.

15.9. Housing requirements for 56,528 new homes between 2021 and 2037 are identified to be delivered in Manchester (3,533 per annum), equating to 34% of the nine local authorities' target of c.164,880 set to address the housing crisis and achieve its ambitions. Ensuring that health, early years and sporting facilities are available to support this scale of uplift is an important consideration for the city.

15.10. The Plan makes clear the importance of Manchester - *"higher levels of housing growth will be focused in the central and northern districts of Greater Manchester. Manchester and Salford will continue to be an appropriate location for the highest levels of new housing due to their central location, good public transport connections, proximity to the main concentrations of employment and leisure opportunities, and ability to deliver very high density developments"*

15.11. Policy JP-H 4 Density of New Housing states that housing development should be delivered at a density appropriate to the location, reflecting the relative accessibility of the Site by walking, cycling and public transport, in accordance with minimum densities and Manchester City Centre has been designated for the highest density development.

The Greater Manchester Strategy – Our People, Our Place (2018)

15.12. The Places for Everyone Plan supports 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:

- A place where all children are given the best start in life and young people grow up inspired to exceed expectations.
- A place where people are proud to live, with a decent home, a fulfilling job, and stress-free journeys the norm. But if you need a helping hand you'll get it.
- A place of ideas and invention, with a modern and productive economy that draws in investment, visitors and talent.
- A place where people live healthy lives and older people are valued.

[79] Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan, following Stockport's withdrawal from the Greater Manchester Spatial Framework process

- A place at the forefront of action on climate change with clean air and a flourishing natural environment.
- A place where all voices are heard and where, working together, we can shape our future.

15.13. Manchester has a key role to play in both the provision of jobs for a growing population and high-quality housing close to employment locations.

Local Planning Policy

Manchester Core Strategy (2012)

15.14. Manchester's Core Strategy supports the sustainability credentials of large scale development planned at high density and on exceptionally well-connected brownfield sites where population growth is most intense - e.g. the high density housing market within the conurbation core.

15.15. The Proposed Development is located economic driver for the City Region and the area of primary economic focus in terms of development. The Strategy sets out key development principles for the City Centre, supporting high density buildings aligning with the Proposed Development. In particular the Strategy supports:

- Apartment-led residential schemes of high quality, which provide for a range of household types.
- Active ground floor uses to animate the City Centre
- New buildings with the highest standard design in terms of appearance and function.
- Accessible, diverse developments and public spaces which appeal to a wide range of people.

Residential Growth Strategy (2016)

15.16. In light of the critical relationship between housing and economic growth, 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 been 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.

Great Jackson Street Strategic Regeneration Framework

15.17. Manchester City Council endorsed a Development Framework for Great Jackson Street in 2007, based on a mix of residential and commercial uses, subsequently updated in 2015 in order to establish a set of development principles appropriate to the creation of a new, more focused residential-led neighbourhood and community in this part of the City Centre, with the potential for 6,500 new homes.

15.18. Planning Permission was granted in July 2016, in line with the principles of the 2015 Development Framework, for a major residential led development at Owen Street. Development has now progressed on site for these 1,494 homes and others at Crown Street Phase 1 are underway, providing a major catalyst to regeneration and commitment to the creation of this new community.

15.19. A 2018 Development Framework was approved to guide the future comprehensive regeneration of the Great Jackson Street area of Manchester City Centre. It updates the 2007 and 2015 Development Frameworks, following a further design review of the proposed masterplan.

15.20. The Development Framework vision remains consistent with the 2015 endorsed version of the document. This is to 'create a vibrant, safe, secure and sustainable community.' In addition, the key development and urban design principles remain. The design evolution of the masterplan principally relates to creation of an enhanced format of high density development, which will enable the provision of a higher level of public realm and will improve the quality of the residential environment.

Our Manchester Strategy

15.21. 'Our Manchester', the Manchester Strategy for 2016 – 2025, sets out the wider strategy and long term vision for the city. The Manchester strategy outcomes include plans for Manchester to become:

- A thriving and sustainable city: supporting a diverse and distinctive economy that creates jobs and opportunities
- A highly skilled city: world class and home grown talent sustaining the city's economic success
- A progressive and equitable city: making a positive contribution by unlocking the potential of our communities
- A liveable and low carbon city: a destination of choice to live, visit, work
- A connected city: world class infrastructure and connectivity to drive growth

15.22. Launched in March 2021, the latest iteration of the Our Manchester Strategy captured the views of people from across the city with over 3,800 residents, businesses, voluntary and community sector, public sector partners and wider stakeholders providing their views on what Manchester's priorities should be. As such, the draft Strategy fully reflects the priorities of residents, businesses, organisations and partners.

15.23. The refreshed Strategy incorporates feedback received from Our Manchester Forum and Executive Members but retained the original Strategy's five themes (A Thriving and Sustainable City; A Highly Skilled City; A Progressive and Equitable City; A Liveable and Zero Carbon City; and A Connected City) as well as reflecting the need to respond to COVID-19.

Assessment Methodology and Significance Criteria

Overarching Approach

15.24. The assessment has determined the baseline position for intervention, taking account of demographic, economic and key social characteristics of the area. It then moves on to consider the potential effects of the Proposed Development and the significance from a socio-economic perspective. It has been prepared to provide an understanding of the overarching impacts of development in the stated location.

15.25. This assessment evaluates the potential impacts on identified socio-economic indicators for the Proposed Development, as well as the cumulative impact of the delivery of the Proposed Development along with other committed developments in close proximity to the Site.

Significance Criteria

15.26. A staged assessment against set criteria has been completed to allow the significance of effects to be accurately and consistently tested. The process gave consideration to:

- The value of the resource (international, national, regional and local level importance);
- The magnitude of the impact;
- The duration involved;
- The reversibility of the effect; and
- The number and sensitivity of receptors.

15.27. The criteria applied in each case are outlined below. The magnitude of the impact was assessed to fall under one of four categories, as outlined in the table below:

Table 15. 1 Methodology for Determining Impact 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.

15.28. The sensitivity of a receptor is based on the relative importance of the receptor using the scale in the table overleaf.

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.
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.

15.29. 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 the table 15.3.

Table 15.3 Impact Significance Matrix

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

15.30. The Proposed Development will comprise of two buildings. New build F1 51 storey residential building, which will provide:

- 494 apartments (158 one-bed, 312 two-bed and 24 three-bed)
- 148 car parking spaces at within 2 basement levels.
- 494 car parking spaces within 3 basement levels

15.31. The new build F2 which will provide:

- 494 apartments (158 one-bed, 312 two-bed and 24 three-bed)
- 148 car parking within 2 basement levels.
- 494 cycle parking spaces within 2 basement levels

Limitations and Assumptions

15.32. As there are no recognised definitive criteria for the assessment of socio-economic impacts, ekosgen has taken a structured approach to quantifying and assessing the scale and nature of potential impacts (relative to baseline conditions) based on their knowledge of overarching guidance and experience of working in the subject area. In cases where impacts could not be quantified, a qualitative judgement has been made, drawing on professional experience.

15.33. The most up to date data from official published sources has been used, however there are some limitations in the baseline data due to ward boundary changes and the availability of ward level 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.

Baseline Conditions

15.34. 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 have been considered to understand both the social and economic characteristics of the area as a starting point for the assessment.

15.35. For the purpose of establishing the baseline, the local Assessment area has been defined to reflect the anticipated catchment area of the Proposed Development and is defined using ward

level data due to varied data availability for different indicators. This section sets out the current socio-economic conditions using ward level data to define the local Assessment area, as well as covering Manchester as a whole and Greater Manchester.

15.36. The local Assessment area contains the Deansgate Ward (which the proposed site sits within – close to the periphery) as well as the closest the Piccadilly ward which covers the rest of the core city centre and the Hulme ward which the Site borders onto. See Figure 15.1 for a map illustrating the Assessment area ward boundaries.

Population

15.37. As of 2019, the Assessment area had a resident population of 58,807, equal to 10.6% of Manchester's population, which was estimated at 552,858 people. Between 2011 and 2019 the population of the Assessment area grew by 35.9% representing an uplift of 17,917 people, compared to 9.4% in the local authority population and 5.8% nationally.[80]

Table 15. 4 Population Estimates (2011 and 2019)[81]

	2011	2019	Change (%)
Assessment area	40,890	58,807	35.9%
Manchester	502,902	552,858	9.5%
Greater Manchester	2,685,386	2,835,686	5.4%
England	53,107,169	56,286,961	5.8%

15.38. In terms of the age structure, 92.0% of the population of the Assessment area is of working age (16-64 years), significantly higher than the proportion of the working age population at the Manchester (70.5%), Greater Manchester (63.6%) and national (62.4%) level.

15.39. This profile corresponds with small proportions of children and older people living within the Assessment area; 5.7% of the population are children (below the age of 16), compared to around one fifth of the population across Manchester, Greater Manchester and nationally. Similarly, just 2.3% of the population are 65 and over, significantly below the Manchester (9.3%) and national share (18.2%).

Table 15.5 Age Structure of the Population (2019)[82]

	Assessment Area		Manchester	
Age	**No.**	**%**	**No.**	**%**
0-15	3,345	5.7%	111,771	20.2%
16-24	23,630	40.2%	97,195	17.6%
25-34	20,758	35.3%	117,797	21.3%
35-49	7,063	12.0%	101,798	18.4%

[80] 2019 ONS Population Estimates
[81] 2019 ONS Population Estimates
[82] 2019 ONS Population Estimates

	Assessment Area		Manchester	
Age	No.	%	No.	%
50-64	2,676	4.6%	72,856	13.2%
16-64	*54,127*	*92.0%*	*389,646*	*70.5%*
65+	1,335	2.3%	51,441	9.3%
Total	58,807		552,858	

Household Composition

15.40. There were 24,227 households in the Assessment area, as of March 2020; 8,680 in the Deansgate Ward, 6,415 in Piccadilly and 9,132 in Hulme, accounting for 10.8% of households in Manchester.[83]

Skills/Education Levels

15.41. As of 2020 a significant proportion of Manchester's working age population held a degree or higher degree qualification, with 47.7% qualified at Level 4 and above compared to 39.1% across Greater Manchester and 42.8% nationally.

15.42. The city had a relatively small population with no qualification at 7.8%, although this was slightly higher than the equivalent Greater Manchester (7.7%) and national figure (6.2%).

Table 15.6: Skills and Qualifications of the Working Age Population (2020)[84]

	Manchester		Greater Manchester		England	
Level 4 +	185,100	47.7%	697,600	39.1%	14,904,600	42.8%
Level 3 +	249,300	64.2%	1,032,100	57.8%	21,350,400	61.3%
Level 2 +	293,100	75.5%	1,348,700	75.5%	27,350,400	78.2%
Level 1 +	331,000	85.2%	1,547,800	86.7%	30,727,100	88.2%
Other qualifications	27,000	6.9%	101,000	5.7%	1976,400	5.7%
No qualifications	30,300	7.85%	137,000	7.7%	2149,000	6.2%

Economically Active and Inactive Population

15.43. At local authority level, the economically active population of Manchester was estimated at 282,000 people, or 72.5% of the working age population (ages 16 to 64), as of 2020, while the employed population was estimated at 257,800 people or 66.3% of the working age population.[85]

15.44. These rates are slightly lower in comparison to national levels, as Manchester has a higher proportion of students, most of which are treated as economically inactive. As of December 2020, 29.1% of Manchester's population is economically inactive, representing 113,300 people. Students account for a significantly large share of the total economically inactive population

[83] ONS 2020 Annual Population Survey
[84] ONS 2020 Annual Population Survey
[85] ONS 2018 Annual Population Survey

(27.5%), compared to Greater Manchester (23.3%) and nationally (20.5%), reflecting the presence of two large Universities in the city, with significant student accommodation in the Assessment area.

Unemployment

15.45. As of December 2020, the unemployment rate in Manchester stood at 8.1% or 22,400 people, above the Greater Manchester level (5.3%). Although unemployment has been steadily declining since 2012, unemployment in Manchester and Greater Manchester are above the national rate of 4.8%. This reflects the significant impact the Covid-19 Pandemic and lockdown restrictions have had on the Greater Manchester economy.

15.46. The Claimant Count measures the number of people who are receiving benefits principally because they are unemployed. From April 2015, the Claimant Count includes all Universal Credit claimants who are required to seek work and be available for work, as well as the remaining Jobseeker's Allowance claimants. Not everyone who is unemployed is eligible to claim unemployment-related benefits.

15.47. As of June 2021, there were 1,610 claimants of unemployment related benefits in the Assessment area, 3.0% of the working age population compared to 11.4% in Manchester, 9.3% in Greater Manchester and 7.2% nationally.

Table 15.7: Claimant Count (June 2021)[86]2020

	Assessment area	Manchester	GM	England
Claimant Count (no.)	1,610	32,280	127,985	1,995,710
Claimant Count (% 16-64 population)	3.0%	8.3%	7.1%	5.7%

Employment – Workplace Analysis

15.48. There are 207,000 jobs in the Assessment area, accounting for 51% of the total employment in Manchester, despite the Area accounting for 10.6% of Manchester's population.[88] This reflects the Area's inclusion of the city centre economy. There has been 24.7% increase in total jobs in the Assessment area since 2015, a greater rate of increase than Manchester (14.3%), Greater Manchester (10.4%) and England (4.9%) since 2019.

Table 15.8: Employment – Workplace Analysis (2015 - 2019)[89]

	2015	2019	Change 2015-19 (%)
Assessment area	161,500	207,000	24.7%
Manchester	350,000	404,000	14.3%
Greater Manchester	1,224,000	1,359,000	10.4%
England	25,044,500	26,307,500	4.9%

[86] ONS 2021 Claimant Count

[88] ONS 2018 Business Register and Employment Survey (BRES)
[89] ONS 2018 BRES

Employment by sector

15.49. Professional, scientific and technical activities, is the most prominent sector by employment within the Assessment area – accounting for 20.3% of jobs as of 2019, above the share of employment in this sector across Manchester as a whole (13.5%) and nationally (9.1%).

15.50. Administrative and support services and Education are the next most prevalent sectors by employment within the Assessment area, accounting for 14.5% and 10.4% of total jobs, respectively. Overall, the Assessment area is a centre for high-skilled service jobs, compared to Manchester and Greater Manchester.

15.51. At local authority level, Manchester's local employment is more diverse, with significant numbers in wholesale and trade, transport and health when compared to the Assessment area.

Table 15.9: Employment by Industry – Workplace Analysis (2019)[90]

	Assessment area		Manchester		GM (%)	England (%)
Prof., scientific and technical activities	42,000	20.3%	54,500	13.5%	9.9%	9.1%
Admin and support services	30,000	14.5%	47,500	11.8%	10.1%	9.0%
Education	21,500	10.4%	40,000	9.9%	8.4%	8.7%
Accommodation	19,500	9.4%	33,000	8.2%	6.1%	7.5%
Retail, Wholesale Motor	18,975	9.2%	47,500	11.7%	16.2%	15.1%
Health	17,000	8.2%	49,500	12.3%	12.7%	12.8%
Financial and Insurance	15,500	7.5%	20,000	5%	3.2%	3.5%
Information & Communication	9,500	4.6%	18,500	4.6%	3.7%	4.5%
Public Admin and Defence	9,500	4.6%	18,500	4.6%	4.2%	4.0%
Arts, Entertainment and Recreational	8,500	4.1%	16,000	4%	4.3%	4.5%
Transport & Storage	5,500	2.7%	28,500	7.1%	6.1%	5%
Property	5,500	2.7%	9,000	2.2%	1.8%	1.8%
Construction	2,375	1.1%	8,000	2%	4.3%	4.8%
Manufacturing	1,250	0.6%	11,500	2.8%	7.4%	7.9%
Agriculture, Forestry, Mining	460	0.2%	36,500	0.3%	1.6%	1.8%
Total	207,000	100%	404,000	100%	100%	100%

GVA

15.52. Gross Value Added (GVA) is the key measure of economic output. In 2018, Manchester's GVA totalled £22.55bn. Between 2012 and 2018. Manchester's GVA grew by 31%, a faster rate of growth than across Greater Manchester (26.7%) and nationally (26.3%).

Table 15.10: GVA in millions (2012 and 2018)[91]

	2012	2018	Change 2012-18 (%)
Manchester	£17,213	£22,550	31.0%
Greater Manchester	£56,036	£71,015	26.7%
England	£1,301,282	£1,643,271	26.3%

[90] Ibid
[91] ONS Regional Accounts

Business Counts

Table 15.11: Business Count Enterprise by Size of Employment (2020)[92]

	Manchester		Greater Manchester		England	
Micro (0 to 9)	20,095	87.9%	92,960	88.9%	2,144,180	89.7%
Small (10 to 49)	2,170	9.5%	9,435	9.0%	200,445	8.4%
Medium-sized (50 to 249)	455	2.0%	1,720	1.6%	36,885	1.5%
Large (250+)	125	0.5%	435	0.4%	9,460	0.4%
Total	22,850		104,550		2,390,970	

Resident and Workforce Income

15.53. The median gross annual pay for residents in Manchester, as of 2020, is £23,017, below the national average of £26,055. In comparison the median gross annual pay for those working in Manchester is £27,789, notably higher than the national average.

Table 15.12: Median Annual Gross Salary – Population Analysis (2020)[93]

	Manchester	Greater Manchester	England
Resident Annual Salary	£23,017	£24,029	£26,055
Workforce Annual Salary	£27,789	£24,262	£26,062
Variance	-£4,772	-£233	-£7

Local Expenditure

15.54. While significant local income expenditure is incurred on mortgage and rents, expenditure relating to comparison and convenience retail, food and drink, recreation and leisure and other expenditure likely to be spent locally, is estimated to be around £11,700 per household each year based on the average weekly household expenditure on goods and services in the UK from the 2019 ONS Family spending survey.

15.55. Based on the number of households in the Assessment area local expenditure per annum by households totals £179.7m.

Healthcare Facilities

15.56. Data on GP surgeries and dental practice data is available on the NHS Choices website for July 2021.[94] A one mile radius was considered appropriate for GP's while a two mile radius was considered appropriate for dental practices (reflecting the preposition that visits to a dental practice are less medically urgent than a GP and therefore a wider radius was selected).

15.57. There are eight GP's within 1 mile of the Site, six of which are accepting new NHS patients according to each GP profile on the NHS website. In terms of dental practices, there are 28

[92] Ibid
[93] ONS 2020 Annual Survey of Hours and Earnings
[94] http://www.nhs.uk/Service-Search

within 2 miles of the Site, of the nine where data is available none are recorded to be accepting new adult and children patients. See Tables 7 and 8 in the Appendix.

Educational Facilities

15.58. There are a number of day nurseries in the City Centre, Hulme and neighbouring wards. There are 10-day nurseries within 1.2 miles from the Site, five of which state they have available places, and the remainder of which information on availability was not available at the time of analysis.

15.59. There are nine primary schools within a 1.2 mile radius of the Site. Using the latest data from the Department for Education (DfE) on school capacity for the academic year 2018/2019, of the schools which are not at or over capacity (seven out of nine, and one with no information available) there is a total of 285 school places available.

15.60. There are 11 secondary schools within a 3 mile radius of the Site. Using the same dataset from DfE, of the secondary schools which are under capacity, there are 2,201 available places, including recently opened academies.

15.61. See Tables 9, 10 and 11 in the Appendix. In addition, private fee-paying schools are not included in this assessment as they are not accessible to all and information on pupil numbers and capacity is not readily available.

Crime

15.62. Greater Manchester Police crime statistics for the last reliable year of crime data (from July 2018 to June 2019) reported 5,769 crimes reported in the GMP defined neighbourhoods of South Gateway (in which the Site sits in) and Hulme.

15.63. Violence and sexual offences accounted for 19.9% of reported crime cases, followed by anti-social behaviour incidents that accounted for 17.6% of all crime cases. Other violent crimes such as criminal damage, robbery and burglary accounted for 20.4% of cases.

15.64. Looking at crime data for ½ mile radius of the Site, between July 2018 and June 2019 there were 7,140 crimes recorded. Violent crime, anti-social behaviour and theft from a person accounted for around half of all crimes recorded.

Table 15.13 Crime Recorded (June 2019)

Type	Count	%
Violent Crime	1268	17.76%
Anti-Social Behaviour	1214	17.00%
Theft from a Person	1098	15.38%
Other Theft	889	12.45%
Vehicle Crime	743	10.41%
Public Order	567	7.94%
Criminal Damage & Arson	322	4.51%
Robbery	314	4.40%
Burglary	254	3.56%
Bike Theft	161	2.25%
Shoplifting	129	1.81%
Drugs	110	1.54%
Weapons	40	0.56%

Type	Count	%
Other	31	0.43%
Total	7,140	

Open Space and Recreational Facilities

15.65. The following public green spaces within 1km radius of the Site[95] have been identified:

- Hulme Park sits within 0.2km from the Site;
- St Georges Park is within 0.6km from the Site;
- St Johns Gardens are 0.7km from the Site; and
- All Saints Park is 1.0km from the Site.

15.66. The following gyms and leisure/sports centres are within 1.5km of the Site:

- Living Well Health club 0.5 km
- Train CrossFit Manchester 0.5 km
- The Gym Manchester Deansgate 0.6 km
- Bannatyne Health Club 0.8 km
- JD Gyms Manchester 0.9 km
- Manchester Aquatics 1.2 km
- Sudgen Sports Centre 1.2 km
- Moss Side Leisure Centre 1.3km

15.67. Given the urban city-centre context, it is considered that existing open space for amenity and recreation within the local area is adequately provided for.

Identification and Evaluation of Significant Effects

Construction Phase

Employment and GVA Effects

15.68. Given the estimated construction cost of the Proposed Development and the average cost per FTE in the construction sector in the North West,[96] suggests the construction of the Proposed Development will support around 2,100 FTE job years over the construction period. Based on the average GVA per FTE in the construction sector in Greater Manchester[97] an estimated Gross Value Added (GVA) of £165 million will be generated.

15.69. The number of construction workers onsite will vary across the construction phase dependent on workforce requirements at each stage. While national and regional construction companies often use their own workers, a proportion is expected to be drawn from the local area. In addition, following Manchester City Council policy requirements, a Local Labour Agreement submitted with the application supports the capture of local benefits.

[95] Considered an accessible walking distance
[96] Using ONS BRES, Annual Business Survey and Annual Population Survey data for 2018
[97] Using ONS BRES and Regional Accounts data for 2018

15.70. Construction spend is recognised to deliver multiplier effects in terms of the indirect impacts as a result of spill-over effects through the supply chain and induced impacts through knock-on consumer spending as a result of wages. Using the CEBR construction multiplier of 1.842, suggests an additional 4,800 FTEs and GVA of £300m will be generated through indirect and induced impact while construction is underway.

15.71. Based on the assessment above, the impact of the construction phase on employment and GVA is considered to have a temporary short term, minor beneficial effect at the local authority level.

Local Expenditure

15.72. The construction workers are expected to generate local expenditure while working at the Site. The Site is located on the edge of the City Centre, close to a variety of retail and food and drink offers nearby including around First Street.

15.73. Assuming expenditure of £3.69 per day based on Visa research on commuters spend across the UK on lunch, lunchtime/food and drink expenditure is estimated at £1.8m over the course of construction period.

15.74. Based on this assessment, the expected impact is considered to be of minor beneficial significance and temporary in nature.

Operational Phase

Housing

15.75. The Proposed Development will deliver 988 new homes, making a contribution to Manchester's housing growth targets in the spatial framework and Core Strategy, and supporting the proposed focus for much of Manchester's housing growth to be delivered in the city centre. High density development such as this also helps to ensure there remains sufficient sites available to accommodate forecast population and employment growth in the city centre.

15.76. Considering the above, the impact of the Proposed Development on housing is considered to be of minor beneficial significance at the Assessment area and local authority scale.

Population

15.77. The Proposed Development will provide 988 new homes, comprising of 316 one-bed, 624 two-bed and 48 three-bed units. Assuming all units are fully occupied, and considering the unit mix, it is estimated the Proposed Development would accommodate circa 2,000 residents. Given that the Site does not currently have any residential provision, the residents are expected to be largely additional to the area and would support a net uplift in the Assessment areas population of 2,000, representing a 3.4% population uplift.

15.78. Based on the current age profile of the assessment area, it is estimated that 1,900 residents will be of working age, helping to support the city centre workforce and growth forecasts for the city.

15.79. The increase in population could lead to potential negative impacts, such as increased crowding, noise and nuisance in the immediate area. However, the Proposed Development will help to regenerate a small area of the southern edge of the City Centre which is currently underutilised, providing high quality accommodation, as well as associated public realm, improvements in access and resident amenities helping to mitigate potential negative effects, including:

- 0.5ha of public realm with an improved pedestrian connection through the Site from Hulme through to Deansgate;
- two servicing bays along Greater Jackson Street in front of each tower;
- A new servicing route through the centre of the Site;
- Residential drop-off areas along Owen Street to the north of Tower F1 and through the centre of the Site to the west of Tower F2; and
- Residential amenities including a gym, studio, residents lounge, and flexible meeting / private dining space.

15.80. Based on the above impacts on population at the Site scale are considered to be of **minor beneficial** significance at the Assessment area level, and permanent in nature. Impacts of the population in relation to employment and healthcare facilities resulting from an increased population are assessed in the following sections.

Local Expenditure

15.81. The additional households accommodated in the Proposed Development will support additional 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. Based on the 2019 ONS Family Spending Survey, it is estimated that households spend around £11,700 per household each year on goods and services in the UK.

15.82. Applying this figure to the estimated uplift in households, annual resident local expenditure of £11.6m is estimated, a 1.7% uplift on total estimated household expenditure in the Assessment area. The estimated annual resident local expenditure of £11.6m is sufficient to support 80 FTEs, based on the economy wide average cost per FTE in the North West[98], and GVA of £5.1m, based on the economy wide GVA per FTE for Greater Manchester.[99]

15.83. The additional local expenditure by residents who are new to the area would be of **minor beneficial** significance to the local economy, and permanent in nature.

Local Authority Income

15.84. The addition of new homes in the Assessment area will generate additional Council Tax revenue for the City Council. While exact Council Tax bandings will not be determined until detailed Site plans are known, making an assumption of a mix between of Council Tax Band B and C properties, and taking into account single person discount for a proportion of the units, once fully built out and occupied the Proposed Development could generate an estimated £1.4m of annual Council Tax income. The additional £1.4m will support the delivery of services across the Local Authority and economic regeneration ambitions.

15.85. Based on this assessment, the local authority income effect is considered to be a permanent, **minor beneficial** impact for the area.

Educational Provision

15.86. Additional demand for school places is expected as a result of the uplift in residents in the Proposed Development. Based on the Assessment Area's proportion of nursery, primary and

[98] using ONS BRES, Annual Business Survey and Annual Population Survey data for 2018
[99] Using ONS BRES and Regional Accounts data for 2018

secondary aged children, it is estimated that the Proposed Development will generate additional demand for the following:

- 24 nursery places;[100]
- 47 primary school places;[101] and
- 32 secondary school places.[102]

15.87. There are ten nurseries within 1.2 miles of the Site, of the five nurseries where the information is available all have available places and between the two nurseries where the information on the number of available places is provided there are 87 places.

15.88. Using Department for Education published data on school capacity, there were 296 available places in primary schools within 1.2 miles of the Site and 2,201 in secondary schools within three miles of the Site in the academic year 2018/19. In addition, a proposed primary school will be introduced as part of Crown Street Phase 2 further adding to the available capacity within the immediate surrounding area.

15.89. The availability of nursery and school places in the local area, suggest that if all estimated nursery aged and primary and secondary school age residents were new to the area and required places at local nurseries and schools there would still be additional capacity available.

15.90. Considering the assessment above, the impact of the Proposed Development on Education Provision is **negligible**.

Healthcare

15.91. The uplift in population as a result of the Proposed Development is anticipated to create additional demand for healthcare facilities, although a proportion of residents in the Proposed Development may already be registered at local facilities.

15.92. Assuming all 2,000 residents estimated to be accommodated in the Proposed Development require a GP and Dentist (within 1 and 2 miles respectively), using the available data suggests on average each GP surgery would need to take on 250 new patients and each dental practice would take 71 patients.

15.93. Of the eight identified GP practices within a mile radius of the Site, six are accepting new NHS patients where data is available, suggesting the additional demand could be able to be accommodated within existing facilities although information on capacity is not available. There are 28 Dental Practices within a 2-mile radius of the Site, although of the nine where information is available, none of these were understood to be accepting new patients at time of writing.

15.94. The Proposed Development is expected to accommodate a relatively young demographic, attracted by the city centre location close to key employment and leisure offers. This is supported by the age profile of the Assessment area, where 93% of the population is under 50. This suggests residents may have a lower demand for healthcare than the older population, limiting the likely magnitude of the impact upon local healthcare providers. In addition, both GP and Dental Practices will take patients that are located outside of this search radius.

[100] Assuming half of all additional residents aged 0-4 will go to nursery
[101] Assuming all residents aged 5-10 attend primary school
[102] Assuming all residents aged 11-15 attend primary school

15.95. Based on this assessment impacts are considered to be of **negligible** significance at the local scale.

Crime

15.96. The Site is a hardstanding formerly used as Peugeot car compound and is currently occupied by the Site cabins and surface car parking associated with nearby construction.

15.97. The Proposed Development will be of high quality with high standards of building design, surveillance and building management, associated public realm increasing connectivity, helping to animate the area, increase footfall and visibility, provide natural surveillance, reduce the sense of isolation and create a better sense of place and community, which in turn can help to reduce some types of criminal activity. However, the increased number of residents in the neighbourhood may lead to a negligible increase in other types of crime.

15.98. Based on this assessment the Proposed Development would have a **negligible** impact on crime at the local scale.

Open Space and Recreational Facilities

15.99. Additional use of open spaces and demand and recreational facilities is expected as a result of the uplift in population arising from the Proposed Development. Given the location of the Site there is significant range of leisure facilities including a large number of gyms and other leisure activities which support a broad population, that is not confined to the city centre. There is also a variety of open spaces within walking distance. The construction of Deansgate Square, recently completed, has provided 1.1 ha of public realm adjacent to the Site. Crown Street will provide a further 1 ha new park in the Great Jackson Street Framework. A new city centre park at Mayfield, currently being delivered, will add to the open space provision in the city centre.

15.100. The Proposed Development will also add 0.5ha of new public realm and 0.05 ha of private amenity gardens at the base of Tower F1 and F2, and residential amenities including a gym and studio.

15.101. Based on this assessment the impact of the Proposed Development on open space and recreational facilities is considered to be **negligible**.

Mitigation Measures

15.102. There are no anticipated adverse effects arising in the Construction Phase in terms of the socio-economic assessment requiring mitigation measures, with impacts identified as minor beneficial. While there are likely to be a number of mitigation measures required for the construction phase, they are not covered within this discipline and will be contained within the other chapters of the ES.

15.103. During the operational phase, once the Proposed Development is complete and occupied, there are no anticipated significant adverse effects, with impacts considered ranging from negligible to minor beneficial, and therefore within the socio-economic assessment there are no mitigation measures required.

Cumulative Effects

15.104. Manchester is experiencing high levels of development at present and it is important to consider the socio-economic effects of the Proposed Development alongside the delivery of wider

development programmes in the surrounding area. The following developments have been identified for consideration as part of the cumulative assessment that are under construction or awaiting planning permission within a 500m radius of the Proposed Development:

1. 2-4 Chester Road 113870/FO/2016 (under construction)
2. Crown Street Phase 1 19806/FO/2018 (under construction)
3. Crown Street Phase 2 126668/FO/2020 (under construction)
4. Viadux 126868/JO/2020 (under construction)
5. 10-12 Whitworth Street 111003/FO/2016/C1
6. Transition 116850/FO/2017
7. 1 Alpha Place 120113/FO/2018
8. Plot 9 First Street 125833/FO/2019
9. 325 Deansgate 125804/FO/2019
10. Hotspur Press 120635/FO/2018
11. Plot 11 Street 125573/FO/2019
12. One City Road128002/FO/2020
13. Plot G, 34 Great Jackson Street 129273/FO/2021
14. 2-4 Whitworth Street 126308/FO/2020

15.105. Five of the 15 developments are under construction and along with the Proposed Development will deliver 42% of the cumulative impacts by 2025/26, with the remaining 9 developments producing a further 58% of the cumulative impacts by 2030/31, assuming they all proceed.

15.106. The developments under construction, those awaiting planning permission and the Proposed Developments will lead to 7,280 new homes, primarily one- and two-bed apartments by 2030/31 when completed and occupied.

15.107. The completion of 7,280 new homes by 2030/31 will provide a boost employment and GVA in the city economy and provide regular local expenditure from the construction workforce. However, the scale of cumulative development will require a skilled construction workforce over a sustained period. This level of activity could lead to skilled shortages over the period, although this is likely to delay rather than postpone planned investment.

15.108. This cumulative scale of development will make a major beneficial contribution to the City's housing needs and its contribution to the Places for Everyone Plan and the annual commitment of 3,555 homes per annum between 2021 and 2037. It will also contribute to the higher density commitment in the Plan. Based on this the cumulative effects on housing, including developments under construction, those awaiting planning permission and the Proposed Development, is considered to have a major beneficial impact on housing.

15.109. The developments under construction along with the Proposed Development will lead to an increased population by 2031 of 14,600, of which 90% will be of working age, making a moderate beneficial contribution to the City workforce, supporting economic growth objectives and the Manchester Industrial Strategy.

15.110. With 7,280 new homes and an uplift in the resident population of 14,600, local expenditure will increase considerably within the Assessment area.

15.111. Considering these schemes with the Proposed Development together, the population uplift of 14,600 residents in the local area is likely to place pressure on some local services, although new development is providing amenity benefits through a large park and high quality public space and facilities such as gyms, with a **moderate beneficial** impact.

15.112. Demand for circa 170 nursery places, 330 primary school places and 230 secondary school places is estimated as a result of the delivery of all of the schemes collectively and the Proposed Development. These numbers are modest relative to the population increase, reflecting the focus of development on one and two bedroomed apartments in high rise developments.

15.113. There are ten nurseries within 1.2 miles of the Site, and there is likely to be sufficient capacity to meet demand if some additional commercial capacity is introduced in the Assessment area in later years. Based on these indicative pupil yields, currently capacity and the new school to be introduced as part of Crown Street Phase 2 could potentially accommodate all of this additional demand on primary school places generated, while there is sufficient capacity to absorb demand for secondary education within local schools with 2,201 places within secondary schools within 3 miles of the Site). The overall cumulative impact on education is **minor - moderate adverse**.

15.114. The ability for the existing healthcare facilities to cope with the uplift in population is less clear, with data on capacity not widely available it is difficult to assess how these facilities would manage with the large number of residential developments leading to a significant influx of residents over the next five years. The forthcoming GP to be delivered as part of Crown Street Phase 1, could potentially add 12,000 patients to capacity and along with the eight identified GP practices within a mile radius of the Site, with six currently accepting new NHS patients, suggest cumulative demand could be met, with an overall assessment of **minor adverse**.

15.115. There are 28 Dental Practices within a 2-mile radius of the Site, although of the nine were information is available none are accepting new NHS patients. This is reflective of a national shortage of dentists prepared to accept new NHS patients. The cumulative population increase likely by 2031 is likely to have a **minor adverse** effect unless the NHS addresses this national issue.

15.116. The uplift in Council Tax income is estimated to be significant and **moderate beneficial**.

Residual Effects

15.117. There are no significant residual effects on socio-economic receptors expected as a result of the Proposed Development.

Table 15.14 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Minor beneficial on construction jobs and GVA	Employment and GVA	None	Minor beneficial on construction jobs and GVA

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Minor beneficial on construction workforce local expenditure	Local Expenditure	None	Minor beneficial on construction workforce local expenditure
Operational Phase			
Minor beneficial on housing	Housing	None	Minor beneficial on housing
Minor beneficial on population	Population	None	Minor beneficial on population
Minor beneficial on household expenditure	Local Expenditure	None	Minor beneficial on household expenditure
Minor beneficial on council tax income	Local Authority Income	None	Minor beneficial on council tax income
Negligible on educational provision	Educational Provision	None	Negligible on educational provision
Negligible on healthcare provision	Healthcare	None	Negligible on healthcare provision
Negligible on incidences of crime	Crime	None	Negligible on incidences of crime
Negligible on open space and recreational facilities	Open Space and Recreational Facilities	None	Negligible on open space and recreational facilities

Summary

15.118. The socio-economic assessment has assessed the likely effects of the Proposed Development in terms of the following issues:

- Employment and GVA;
- Local expenditure;
- Housing;
- Population;
- Local authority income;
- Educational provision;
- Healthcare;
- Crime; and
- Open space and recreational facilities.

15.119. The Table below summarises the effects of the Proposed Development considering the residual effects (although no mitigating measures are expected to be required) and the cumulative effects, which takes into account relevant developments currently under construction and as well as those or awaiting planning permission that are occurring nearby.

Table 15.15 – Summary of Receptors, Residual Effects and Cumulative Effects

	Residual Effect	Cumulative Effect
Construction Phase		
Employment and GVA	Minor beneficial	Moderate beneficial
Local Expenditure	Minor beneficial	Moderate beneficial
Operational Phase		
Housing	Minor beneficial	Major beneficial
Population	Minor beneficial	Moderate beneficial
Local Expenditure	Minor beneficial	Moderate beneficial
Local Authority Income	Minor beneficial	Moderate beneficial
Educational Provision	Negligible	Minor-moderate adverse
Healthcare	Negligible	Minor adverse
Crime	Negligible	Minor adverse
Open Space and Recreational Facilities	Negligible	Minor beneficial

Reference List

15.120. This chapter has been prepared using the following sources:

- National Planning Policy Framework (NPPF)
- Places for Everyone Plan
- The Greater Manchester Strategy – Our People, Our Place
- Manchester Core Strategy
- Residential Growth Strategy
- Great Jackson Street Strategic Regeneration Framework
- Our Manchester Strategy
- ONS Census
- ONS Business Register and Employment Survey (BRES)
- ONS UK Business Counts
- ONS Annual Population Survey
- ONS Annual Survey of Hours and Earnings (ASHE)
- Manchester Intelligence Hub

Figures

Figure 15.1 - Ward Boundaries



16. Residual Impacts

16.1. This section contains a summary of the residual effects of the Proposed Development.

Air Quality

16.2. Predicted impacts on NO2 and PM_{10} concentrations as a result of the operational phase were predicted to be not significant at all sensitive receptor locations considered, within the vicinity of the Site. Consequently, the residual effects resulting from road vehicle exhaust emissions associated with traffic generated by the Proposed EIA Development are predicted to be not significant.

Construction Phase

16.3. Assuming the relevant mitigation measures outline in Table 6.24 are implemented, the residual effect from all dust generation activities is predicted to be not significant.

Operational Phase

16.4. Overall impacts on NO2 and PM_{10} concentrations as a result of the operational phase were predicted to be not significant within the vicinity of the Site. Consequently, the residual effects resulting from road vehicle exhaust emissions associated with traffic generated by the Proposed Development are predicted to be not significant.

Table 16.1 Air Quality Summary of Receptors, Significant Effects, Mitigation Measures, and Residual Effects

Receptor(s)	Likely Significant Effect	Mitigation Measure	Residual Effect
Construction Phase			
Human – Existing **Dust Soiling/Health**	Major adverse on a temporary basis	The Proposed Development will incorporate the specific construction phase mitigation measures outlined in the IAQM guidance.	Minor adverse dust impacts to property and people on a temporary basis
Operational Phase			
Human – Future Site Users **Existing Road Vehicle Pollutant Concentrations – Health**	Major adverse on a permanent basis	Proposed Development will be required to incorporate mechanical ventilation system to each affected floor level that has been predicted to be subjected to exceedances of the AQO for NO2. The ventilation systems will include individual NOx filtration units which will effectively remove NOx pollutants, reducing the concentrations to acceptable and safe levels.	Negligible exposure to elevated pollutant concentrations on a permanent basis

Receptor(s)	Likely Significant Effect	Mitigation Measure	Residual Effect
Human – Existing Sensitive Locations **Additional Road Vehicle Pollutant Concentrations – Health**	Negligible impacts upon existing sensitive uses on a permanent basis	The Proposed Development will consider best practice measures in the form of sustainable transport principles. The provision of high-level cycle parking facilities as well as availability of Electric Vehicle Charging Points will secure a reduction in development related road vehicle exhaust emissions.	Negligible impacts upon existing sensitive uses on a permanent basis

Climate Change

16.5. The effects from whole life embodied emissions (incl. construction transport) and operational transport emissions assessed are likely to have a residual minor magnitude of impact and therefore a Moderate-Minor (adverse) residual significance on the climate. This is considered to be 'not-significant' in EIA terms.

16.6. On the other hand, the effects from operational building emissions assessed are likely to have a residual moderate magnitude of impact and therefore a Major-Moderate (adverse) residual significance on the climate. This is considered to be 'significant' in EIA terms.

Environmental Effect	Sensitivity of Receptor	Nature of Impact	Impact Magnitude	Significance	Additional Mitigation	Residual Impact Magnitude	Residual Significance
Whole Life Embodied emissions (incl. construction transport)	High	Adverse	Negligible	Minor Adverse	Whole life carbon and construction reduction measures and further optimisation of the construction transport schedule further explored in later design stages, where possible	Negligible	Minor Adverse
Operational Building emissions	High	Adverse	Moderate	Major - Moderate Adverse	A+++ whitegoods and appliances	Moderate	Major - Moderate Adverse
Operational Transport emissions	High	Adverse	Moderate	Major - Moderate Adverse	On demand EV Charging up to 20%	Minor	Moderate - Minor Adverse

Daylight, Sunlight and Overshadowing

Table 16.2 – Sunlight, Daylight and Overshadowing Summary of Receptors, Significant Effects, Mitigation Measures and Residual Effects

Likely Significant Effect	Receptor	Mitigation	Residual Effect
Construction Phase			
Daylight	Scoped Out	-	-
Sunlight	Scoped Out	-	-
Operational Phase			
Daylight	Surrounding Residential Properties	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Sunlight	Surrounding Residential Properties	None required	Negligible to Moderate Permanent Adverse (Non-Significant Effect)
Overshadowing	Surrounding Amenity Areas	None Required	Permanent Negligible to Minor Permanent Adverse (Non-Significant Effect)

Noise and Vibration

16.7. Table 16.3 summarises the post-mitigation residual effects.

Table 16.3 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Major to Moderate adverse construction noise	Local residents	Para. 9.111 & 9.112: Solid screening around Site. Communication with City Council and local residents.	**Negligible construction noise effects**

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
		Application of 'Best Practicable Means' and noise control guidance from BS5228.	
Operational Phase			
Negligible building services plant noise effects	Residential properties	Para. 9.102: Adherence to environmental noise limits for plant	Negligible building services plant noise effects
Negligible activity noise effects from amenity space	Residential properties	Para. 9.108: Adherence to environmental noise limits for amenity spaces	Negligible activity noise effects from amenity spaces

16.8. The principal long-term potential environmental noise source due to the operation of the Proposed Development is building services plant. Building services plant noise emissions from the Proposed Development will be controlled through careful design and specification of building services plant and by provision of acoustic screens and attenuators where required, to meet the noise emissions criteria at each noise sensitive receptor at and around the Site. As such, negligible impact is expected.

16.9. The minimum required sound insulation performance of the curtain wall to the dwellings of the Proposed Development has been identified. Compliance with the performance criteria should ensure that the impact of environmental noise levels at the Site on the occupants of the Proposed Development is negligible.

16.10. External noise criteria have been specified for the allowable levels of activity noise egress from the proposed amenity space. Compliance with the criteria would lead to negligible noise effects at sensitive receptors.

16.11. The residual impacts assume that the mitigation and recommendations described in Chapter 9 have been implemented in order to achieve the criteria or the lowest practicable levels.

Human Health

Table 16.4 Summary of Health-Related Topics, Likely Significant Effects, Mitigation Measures, and Residual Effects Significant Receptors listed as identified from each technical chapter and as relevant according to those presented in paragraph 10.29 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Socioeconomics: jobs & employment	Employment & GVA	None needed	**Minor Beneficial**
Socioeconomics: local expenditure	Local expenditure	None needed	**Minor Beneficial**

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Townscape & Visual:	Local viewpoints	High-quality hoardings	**Negligible**
Transport: safety, severance, amenity, delay	Residents, visitors	CEMP	**Slight Adverse** which is **Not Significant**
Air Quality: dust, vehicle emissions	39 sensitive locations	CEMP	**Negligible** which is **Not Significant**
Noise & Vibration	Residents, visitors, educational facilites.	CEMP	**Negligible** which is **Not Significant**
Daylight, over-shadowing	None	None needed	None
Solar Glare:	Road users & tram drivers	None needed	**Negligible to Minor Adverse** which is **Not Significant**
Climate Change	None	None needed	None
Wind Microclimate	None	None needed	None
Operational Phase			
Socioeconomics: Housing	Residents	None needed	**Minor Beneficial**
Socioeconomics: Economy	Local expenditure & Council income	None needed	**Minor Beneficial**
Socioeconomics: Education	Residents & Locals	None needed	**Negligible**
Socioeconomics: Healthcare	Residents & Locals	None needed	**Negligible**
Socioeconomics: Crime	Residents & Locals	None needed	**Negligible**
Socioeconomics: Space & Recreation	Residents & Locals	None needed	**Negligible**
Townscape & Visual Impact	19 viewpoints	None needed	**Negligible (5); Minor Beneficial (9); Moderate Beneficial (5)**
Transport: safety, severance, amenity, delay	Residents, visitors	None needed	**Neutral to Slight Adverse** which is **Not Significant**
Air Quality: vehicle emissions	Residents, visitors	EV charging points	**Negligible** which is **Not Significant**
Noise & Vibration	Residents, visitors	Plant noise limits	**Negligible** which is **Not Signficant**
Daylight, Sunlight	10 surrounding residential buildings	None needed	**Negligible** to **Moderate Adverse** which is **Not Significant**
Over-shadowing	Surrounding amenity areas	None needed	**Negligible** to **Minor Adverse** which is **Not Significant**
Solar Glare:	Road users & tram drivers	Embedded in design	**Minor Adverse** which is **Not Significant**
Climate Change	The climate	Embedded in the design and sustainable transport	**Moderate adverse**

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Wind Microclimate	All receptors – pedestrian safety	None needed	**Negligible**
Wind Microclimate	Pedestrian comfort Receptor No 5	Evergreen hedging	**Negligible**
Wind Microclimate	Pedestrian comfort Receptor no 11	Screens & evergreen hedging	**Negligible**
Wind Microclimate	Pedestrian comfort All other receptors	Planting and wind mitigation as well as embedded design.	**Negligible**

Solar Glare

16.12. The likely significant effects of solar glare from the Proposed Development are considered a worst-case scenario. All solar glare effects to road junctions are considered high sensitivity and the effects are permanent and long term, therefore the residual effects are the same as during the operational stage.

16.13. Details of the likely residual effects of the Proposed Development are set out below.

Table 16.5 – Solar Glare Summary of Receptors, Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Negligible to Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	None	Negligible to Minor adverse and not significant effects on Solar Glare
Negligible to Minor adverse and not significant effects on Solar Glare	Tram drivers on nearby tracks	None	Negligible to Minor adverse and not significant effects on Solar Glare
Operational Phase			
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	Embedded in the design	Minor adverse and not significant effects on Solar Glare
Minor adverse and not significant effects on Solar Glare	Tram drivers on nearby tracks	Embedded in the design	Minor adverse and not significant effects on Solar Glare

Townscape and Visual Impact Assessment

16.14. 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 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 8.10.

16.15. In this regard Table 12.10 records that in most cases, the Proposed Development will have minor to negligible significance of effect. Accordingly, all effects are recorded as being not significant in EIA terms. All effects are recorded as beneficial.

16.16. The principal reason behind this is the proximity of the Proposed Development to neighbouring tall buildings such as Deansgate Square, Elizabeth Tower and River Street and the positive contribution the Proposed Development will make to this cluster. The Proposed Development therefore complements and fits in with this emerging pattern of townscape character in a consistent way.

Traffic and Transport

16.17. 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.

16.18. The construction phase is likely to have a direct, temporary, short-term (reversible), minor adverse effect at a local level for the following, which is not significant. Notwithstanding, it is considered appropriate to provide a CEMP with various measures that promote travel planning, considerate construction practices and agree traffic management measures.

16.19. Following the implementation of these measures, the impacts of the construction phase would remain as minor adverse and not significant.

16.20. 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. Notwithstanding, the Proposed Development will deliver benefits to the local area through improved public realm, and pedestrian and cycle facilities. The Site will also be supported by an FTP to encourage residents to use sustainable modes of transport and thereby minimise the traffic impacts of the Proposed Development.

16.21. Following the implementation of these measures, the impacts of the operational phase would remain as neutral to minor adverse and not significant.

Wind Microclimate

16.22. The completed Proposed Development (Phase A only) with existing surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between Moderate Adverse (Off-Site Receptors) and Moderate Beneficial and are Not Significant.

16.23. The completed Proposed Development (Phase A and B) with existing surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between Moderate Adverse (Off-Site Receptors) and Moderate Beneficial and are Not Significant.

16.24. The completed Proposed Development (Phase A only) with cumulative surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between Moderate Adverse (Off-Site Receptors) and Moderate Beneficial and are Not Significant.

16.25. The completed Proposed Development (Phase A and B) with cumulative surrounds, with the inclusion of mitigation, results in residual effects primarily ranging between **Moderate Adverse** (Off-Site Receptors) and **Moderate Beneficial** and are **Not Significant**.

Table 16.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Residual Effect
Construction Phase			
Negligible	-	None	Negligible
Operational Phase			
Major Adverse	'Receptor 5'	1 unit of 1.5m (H) evergreen hedging near the south corner of F2	Negligible
Major Adverse	'Receptor 11'	3 units of 1.5m (W) × 2.5m (H) 50% porous screens close to the eastern corner of F1 and 2 units of 1.5m (H) evergreen hedging either side of the main entrance of F1	Negligible
Ranging between Moderate Adverse to Moderate Beneficial	All other receptors	None specifically	Ranging between Moderate Adverse to Moderate Beneficial

Socio-Economic

16.26. The socio-economic assessment has assessed the likely effects of the Proposed Development in terms of the following issues:

- Employment and GVA;
- Local expenditure;
- Housing;
- Population;
- Local authority income;
- Educational provision;
- Healthcare;
- Crime; and
- Open space and recreational facilities.

16.27. Table 16.7 below summarises the effects of the Proposed Development considering the residual effects (although no mitigating measures are expected to be required) and the cumulative effects, which takes into account relevant developments currently under construction and as well as those or awaiting planning permission that are occurring nearby.

Table 16.7 – Residual effects of the Proposed Development on Socio-economic receptors.

Likely Significant Effect	Receptor	Mitigation	Residual
Construction Phase			
Minor beneficial on construction jobs and GVA	Employment and GVA	None	Minor beneficial on construction jobs and GVA
Minor beneficial on construction workforce local expenditure	Local Expenditure	None	Minor beneficial on construction workforce local expenditure
Operational Phase			
Minor beneficial on housing	Housing	None	Minor beneficial on housing
Minor beneficial on population	Population	None	Minor beneficial on population
Minor beneficial on household expenditure	Local Expenditure	None	Minor beneficial on household expenditure
Minor beneficial on council tax income	Local Authority Income	None	Minor beneficial on council tax income
Negligible on educational provision	Educational Provision	None	Negligible on educational provision
Negligible on healthcare provision	Healthcare	None	Negligible on healthcare provision
Negligible on incidences of crime	Crime	None	Negligible on incidences of crime
Negligible on open space and recreational facilities	Open Space and Recreational Facilities	None	Negligible on open space and recreational facilities

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 Site (e.g. local residents and businesses located in close proximity to the Site), likely cumulative effects, and their capacity to accommodate changes that will occur as a result of the combined residual environmental effects.

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 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	Potential minor adverse noise, vibration on construction workers during construction works	No likely significant Type 1 cumulative effects
Neighbouring residential properties	Short term minor adverse impacts arising from construction noise and vibration, and transport	Temporary in-combination effects of construction phase noise and dust impact and transport. **Minor adverse, temporary**
Local highway, public transport, pedestrian, and cycle networks	Negligible to moderate 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 dust impact and transport. Is at most **Moderate adverse, temporary, with most instances being minor or negligible adverse effects.**

Sensitive Receptor Group	Construction Phase Residual Effects	Likely Significant Cumulative Effects
Views, visual setting, and townscape	Minor to moderate adverse impacts on townscape character	No likely significant Type 1 cumulative effects due to being temporary in nature.

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) 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 to the west, east and north of the 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, 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 Minor Permanent Adverse on impacts on daylight. Negligible to minor adverse noise impact on nearby sensitive receptors through changes in road noise and existing road noise	In-combination effects of sunlight and daylight and noise impacts on future residents and properties neighbouring the Site. Minor adverse impact, permanent.
Local highway, public transport, pedestrian, and cycle networks	Negligible to moderate adverse impacts on road users from Solar Glare Minor adverse impact on pedestrians from an amenity, highways safety, and severance perspective from small increases in traffic movements. Minor adverse impact on cyclists from a highways safety and severance perspective from small increases in traffic movements.	In-combination effects of solar glare, noise, and transport impacts on the local highway network, public transport, pedestrians, and cycle networks. Moderate adverse impact, permanent.
Views, visual setting, and townscape	Effects ranging from negligible to minor beneficial in regard to townscape setting.	No likely significant Type 1 cumulative effects
Local residents, visitors and nearby population receptors	Minor beneficial impact in relation to socio-economic indicators. Moderate beneficial to moderate adverse effects in relation to off site wind impact.	No likely significant Type 1 cumulative effects as no safety issues or on site issues present.

17.30. Table 17.2 shows that there is the potential for in-combination operational phase Type 1 cumulative effects to arise in relation to the following receptor groups:

- Neighbouring residential properties; and
- Local highway, public transport, pedestrian, and cycle networks.

17.31. For neighbouring residential properties, the interactions are limited to impacts from noise and sunlight and daylight. When considering sunlight and daylight, it should be noted that the impact is only on 'daylight' rather than both elements. In addition, there should be an expectation that a higher degree of obstruction is inevitable in an area with modern high-rise buildings. In this respect, 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.

17.32. The existing residential receptors surrounding the development Site reside in a City Centre location where there is an expectation for a higher density of development and, consequently to this, a higher tolerance for less daylight. The identified receptors are therefore deemed to have a medium sensitivity, rather than a high sensitivity, which would relate more closely to the sub-urban model described above. The minor adverse noise impact arises from additional vehicle movements, however it should be noted that many of the nearby sensitive receptors in this regard are already on major roads.

17.33. For the local highway, public transport, pedestrian, and cycle networks receptor group, the interactions are from solar glare and increased vehicle movements leading to changes in amenity, highways safety, and severance. The increased vehicle movements only lead to minor adverse impacts on these groups. The Transport chapter highlights that trips from the Site will likely be distributed across the highways network, potentially reducing the impact on any one part of it. Conversely, Solar Glare impacts are restricted to particular parts of the highway network where there is an interaction between the building and existing traffic signals.

17.34. Although the potential for a Type 1 cumulative effect does arise, it is considered that the impacts affect in different ways so any cumulative impact is less likely to arise. Therefore, a moderate adverse impact on a permanent basis is seen as reasonable.

Mitigation Measures

17.35. Where relevant, the individual residual effects which contribute to the potential cumulation have been considered within the ES and mitigated where necessary and feasible.

17.36. No mitigation is proposed for the identified Type 1 cumulative effects.

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Although we have read the Consultants' reports for consistency and provide our observations based on our knowledge and experience, we accept no liability or responsibility for the Consultant's Reports and will not be responsible for the technical content of Chapters 6-15, Volume 1, nor Volumes 2 – 3, nor the technical content of the associated separate Non-Technical Summary.

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