



Crown Street Phase 3 and Plot D
Environmental Impact Assessment (EIA)
Screening and Scoping Report
March 2023

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1. Introduction

- 1.1. This Environmental Impact Assessment (EIA) Screening and Scoping Report has been prepared in respect of the proposals for the development of Crown Street Phase 3 (partial Plot C and Plot E) and Plot D of the Great Jackson Street Framework in Manchester City Centre ('the EIA Site'). The EIA Site is bounded by the A57(M) Mancunian Way to the south, a combination of existing low-rise services and parking to the north, Crown Street Phase 2 apartments to the west, Deansgate Square Towers and the Plot F Site to the east, and Great Jackson Street running through the centre. The EIA Site forms a major part of the Southern Gateway redevelopment initiative and is situated on a key entry point into Manchester City Centre.

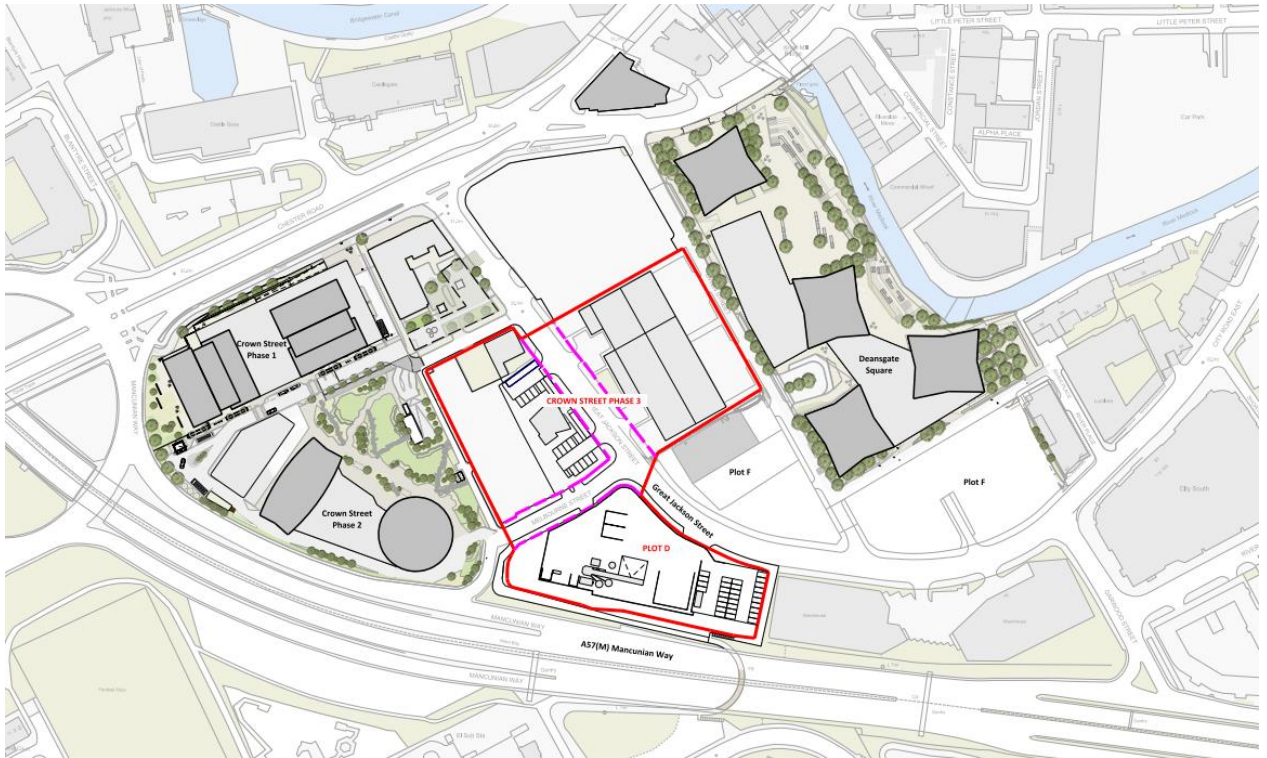


Figure 1 Site Plan

- 1.2. The term "Proposed Development" used within this Report refers to all stages of construction and operation of development. The Proposed Development will be brought forward as two separate applications (with two separate red line boundaries) for Full Planning Permission supported by one overarching EIA. The applications comprise:
- Crown Street Phase 3: bound by Silvercroft Street and Owen Street Car Park to the north, Melbourne Street and Plot F to the south, Owen Street and Deansgate Square to the east, and the under construction Crown Street Phase 2 to the west.
 - Plot D: bounded by Great Jackson Street to the northeast, the A57(M) Mancunian Way to the South, Melbourne Street to the northwest, public footpath to the east and a warehouse beyond this.
- 1.3. This Screening and Scoping Report is submitted to Manchester City Council (MCC) as a request for a Scoping Opinion under Regulation 15 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
- 1.4. In accordance with Regulation 15, paragraph 2(a), this report contains:
- A plan sufficient to identify the land enclosed at Appendix 1.
 - A brief description of the nature and purpose of the Proposed Development and of its possible effects on the environment.
 - An explanation of the likely significant effects of the development on the environment.

EIA Requirements

- 1.5. The EIA process is the mechanism by which development proposals are appraised in relation to the environmental criteria as well as socio-economic, engineering, and technical considerations. The EIA process defines the context of the Proposed Development and examines the issues considered pertinent.
- 1.6. The purpose of the EIA is to establish both the nature of the Proposed Development and the environment within which it is likely to take place in order to identify likely significant effects on the environment that may arise. This is also undertaken by comparing the existing situation at the start of the work (baseline) with the situation once the Proposed Development is in place.
- 1.7. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require that any proposed development falling within the description of a 'Schedule 2 development' within the meaning of the 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 4(2)).
- 1.8. The Proposed Development falls under the category of "Infrastructure Projects – Urban Development Projects" (Schedule 2, 10, (b)) as described in the Regulations. The applicable threshold above which EIA is likely to be required includes for (i) development of more than 1ha of urban development that is not a dwelling house, or (ii) if the development includes more than 150 dwellings, or, (iii) if the overall development is over 5ha. The indicative thresholds and criteria state that:

"In addition to the physical scale of such developments, consideration should be given to the potential increase in traffic, emissions and noise. EIA is unlikely to be required for the redevelopment of land unless the new development is on a significantly greater scale than the previous use, or the types of impact are of a markedly different nature or there is a high level of contamination."
- 1.9. The EIA Site covers an area of c.1.5 hectares and comprises c.2,388 residential dwellings. Therefore, the proposals exceed the thresholds as set out in Schedule 2 indicating that an EIA is more likely to be required.
- 1.10. Given the nature of the Proposed Development, an EIA is considered appropriate to test the likely significant effects of the Proposed Development. The Applicant therefore proposes to submit an Environmental Statement in relation to certain topic areas where there is likely to be a significant effect of the environment in support of the planning applications.

Purpose of the Scoping Report

- 1.11. The process of identifying likely significant effects on the environment which should be addressed by the EIA is termed 'scoping' and the results are presented as a Scoping Report.
- 1.12. This Scoping Report sets out the framework within which the Environmental Statement ('ES') will be produced and the topic areas and information that will be contained within the document. It is issued to MCC as the Local Planning Authority ('LPA') for circulation to Statutory Consultees and other organisations who are invited to express their views on the proposed scope of the EIA or suggest additional issues which may be considered to be of significance. The views expressed by Statutory Consultees will then be used by the LPA to inform the formal Scoping Opinion.
- 1.13. The LPA is required to respond to a formal request for a Scoping Opinion within five weeks of registering receipt.
- 1.14. Should the proposed scope of the EIA be accepted by the LPA, the intention would be that any future application relating to the Proposed Development would be accompanied by an EIA which would be produced by the team as set out in Table 1 and coordinated by Deloitte LLP (IEMA EIA Quality Mark registered). The consultants have provided technical input to this initial EIA Scoping Report.

Note: Although Deloitte LLP has read the input of the project team (as listed in the table below) for consistency and provide observations based on our knowledge and experience, we accept no liability or responsibility and will not be responsible for the technical content.

Table 1 EIA Project Team

Company	Discipline
Enzygo	Air Quality
Curtins	Transport Assessment
Eksogen	Socio-economic Impact
Simpson Haugh & Partners LLP	Architect
Fisher Acoustics	Noise Impact
GIA	Daylight & Sunlight Overshadowing and Solar Glare
WSP	Wind Microclimate
WSP	Climate Change
WSP	Ground Conditions
Chris Burnett	Townscape & Visual Impact
Eskogen	Human Health Assessment
Deloitte	Planning Consultant & EIA Coordinator

- 1.15. The remainder of this report is structured as follows:
- Section 2 of this report provides an EIA Site description and outlines the nature of the Proposed Development.
 - Section 3 sets out the proposed scope and structure that an ES would take and who might need to be consulted.
 - Section 4 provides details of the proposed EIA methodology, which would be used in assessing the Proposed Development.
 - Section 5 sets out the key issues that would be addressed by the EIA.

2. EIA Site Description and Proposed Development

EIA Site Description

- 2.1. Two separate planning applications are being submitted at the same time; one for Crown Street Phase 3 (partial Plot C and plot E of the Great Jackson Framework), and one for Plot D of the Great Jackson Street Framework. As these are being submitted together the environmental impacts of both applications will be considered holistically as part of the Environmental Impact Assessment.
- 2.2. The two sites are depicted on Figure 1.
- 2.3. The Crown Street Phase 3 application site currently comprises a cleared site to the east of Great Jackson Street, to the west of Great Jackson Street is the Renaker Marketing Suite, the Manchester Carers Forum (Gaddum House) and temporary cabins associated with development elsewhere in the Framework area. Plot D includes a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete.
- 2.4. An EIA Site Location Plan is provided at **Appendix 1**.

Wider Area

- 2.5. The EIA Site is located in a key strategic location to the south of the city centre. It is within a ten-minute walk of the Deansgate Transport Hub, providing access to the rail and tram network, and within walking distance of two key transportation hubs at Manchester Oxford Road Station and Piccadilly Station both of which offer local, regional, and national main line rail connections. Both stations also provide direct access to Manchester Airport.
- 2.6. The EIA Site is also within easy walking distance to employment opportunities and the services and facilities offered by Manchester City Centre and in close proximity to the district of Hulme, just beyond the Mancunian Way to the south. It benefits from being in close proximity to Oxford Road which is a bus corridor with many services linking Manchester City Centre, the Oxford Road Corridor, and South Manchester. It is also within easy access of the City's Inner Ring Road which connects with key arterial routes leading to the strategic motorway network.
- 2.7. The majority of uses to the east of the EIA Site are residential, comprising Deansgate Square towers, Boatman's, City South, Canvas Manchester, Lumiere and other apartment blocks. To the south, past the A57(M) is the established Hulme community predominantly comprising housing and community uses, as well as Hulme Park. The Hulme area is connected to the EIA Site area via Hulme footbridge, providing a significant link for pedestrians to and from the area. To the north, further residential developments are located including Elizabeth and Victoria Towers (developed under Crown St Phase 1) and beyond this, past the A56 Chester Road, is Castle Wharf and Castle Quay Apartments.
- 2.8. Several notable cultural attractions are within easy walking distance of the EIA Site, including the Palace Theatre, HOME, The Gay Village, and Chinatown. Furthermore, the EIA Site is well located in proximity to major commercial developments in Manchester City Centre, including First Street, Spinningfields and St Johns.

EIA Site Specific Environmental Designations

Air Quality

- 2.9. The EIA Site is situated in the Greater Manchester Combined Authority Air Quality Management Area (AQMA).

Ecology

- 2.10. The EIA Site is not within, nor does it contain, any ecological designations including EIA Sites of specific scientific interest (SSSI), EIA Sites of biological importance (SBI) or special protection areas (SPA). The River Irwell Site of Biological Importance (SBI) lies 1.5 kilometres north-west of the EIA Site.
- 2.11. The EIA 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

- 2.12. The EIA Site is located circa 65m from Castlefield Conservation Area to the west and there are 17 Listed Buildings within with immediate vicinity area of the EIA Site as shown in Figure2 below. There are no heritage assets on site.

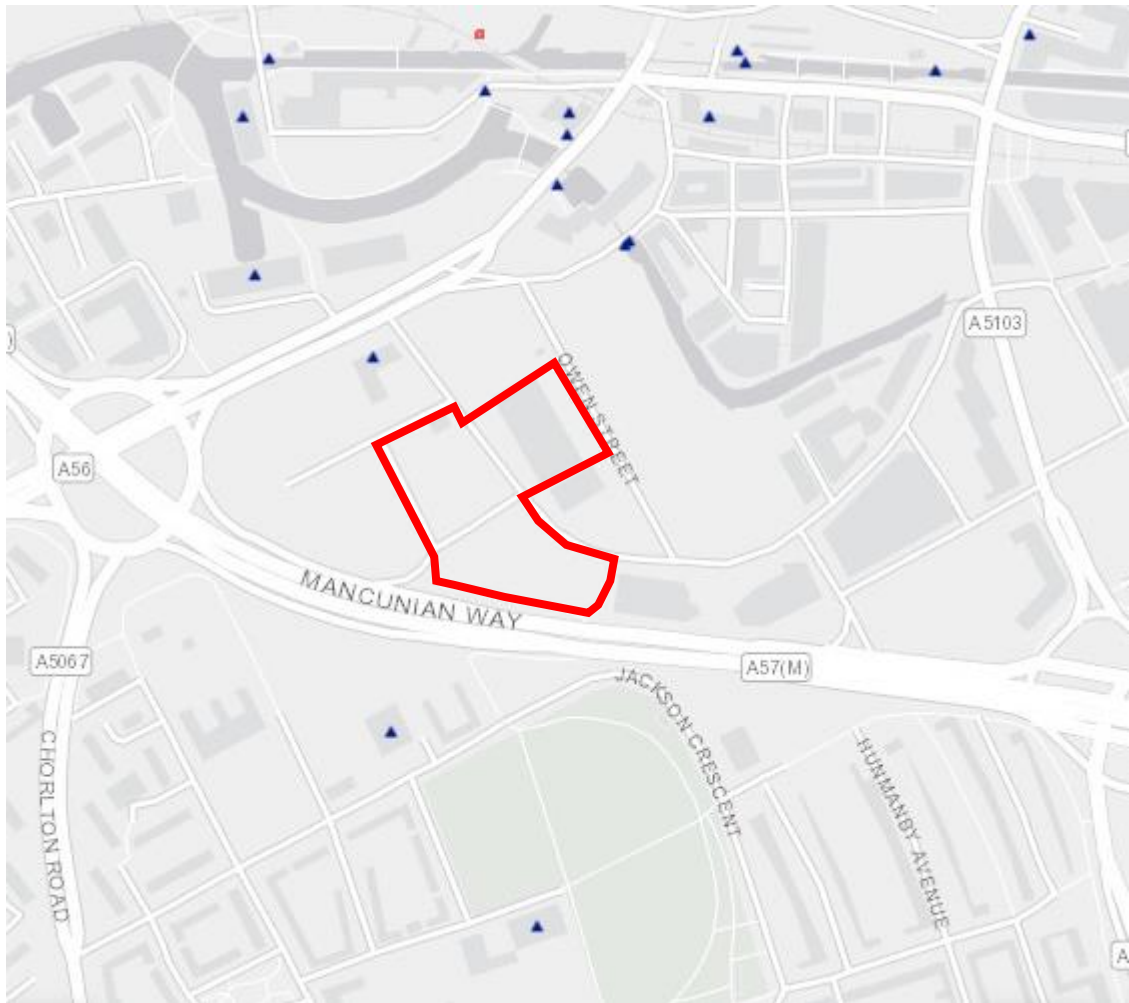


Figure 2 Listed Buildings within approx. 500m of the surrounding areas of the EIA Site (Historic England Map, 2022)

Flood Risk and Drainage

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

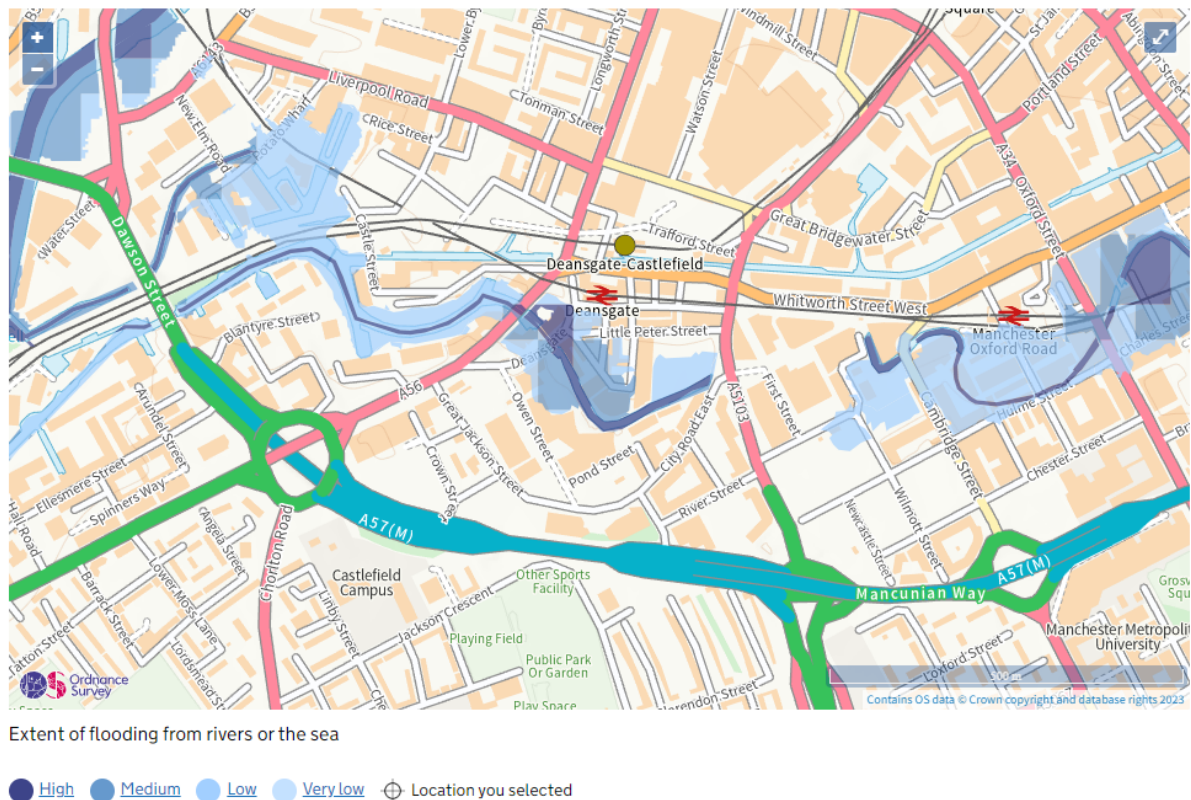


Figure 3 The EIA Site is within an area of Low Flood Risk (Source: Environment Agency)

Strategic Context

- 2.16. A Development Framework for Great Jackson Street was first endorsed by MCC's Executive Committee in 2007. The 2007 Development Framework aimed to create "A new high-density quarter of Manchester with a vibrant and sustainable mix of uses, whose economic viability is driven by 'knowledge capital'; comprising high quality urban architecture that enriches the City's public realm and establishes its reputation for design excellence building".
- 2.17. The EIA Site forms Part of Plot C, E and D 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 updated in both 2015 and 2018.
- 2.18. Most recently, the Framework was updated to reflect the potential for further growth in this part of Manchester City Centre.
- 2.19. Following public consultation organised by MCC, the 2018 Framework was endorsed by the Executive Committee in January 2018 and now forms a material consideration in the determination of any planning application within its boundary.
- 2.20. The vision for the Framework area has remained consistent since the 2015 endorsed version of the document; to 'create a vibrant, safe, secure and sustainable community'. The Framework establishes guiding development principles for the regeneration of Great Jackson Street to be characterised by high rise residential development.
- 2.21. Existing uses within the Framework area include light industrial units, offices, residential dwellings, and retail uses. A number of the key Framework plots have either been completed or are under construction to deliver new residential-led schemes, which is set out in the list of committed developments (Appendix 2) that will form part of the EIA to be submitted in support of the application.

Planning History

- 2.22. Planning Permission (reference 116850/FO/2017) has now lapsed at the former Olympia Trading Estate (Plot E of the Great Jackson Street Framework) for 3 residential tall buildings.
- 2.23. Other recent planning history at Plot D relates to the on Site concrete batching plant.
- 2.24. A full list of all baseline and cumulative developments both within and beyond the boundary of the EIA Site are set out in Appendix 2 of this EIA Scoping Report, which has been agreed the Local Planning Authority.

The Proposed Development

- 2.25. The proposed EIA Scoping parameter of development is set out within Tables 2 and 3 below. Please note these do not represent design freeze information, which will be included within the respective planning applications.

Table 2 Proposed uses, units and height (Date last updated: January 2023) for Crown Street Phase 3

Parameters for Development	
EIA Site Area	Plot C = 0.41 Plot E = 0.49 TOTAL = 0.9 hectares
Residential Apartments	1,833
Flexible Commercial Space	1,057m ²
Maximum Height (AOD)	Approx. 194m
Car Parking	496
Cycle Parking	1,833

Table 3 Proposed uses, units and height (Date last updated: January 2023) for Plot D

Parameters for Development	
EIA Site Area	0.47 hectares
Residential Apartments	642
Flexible commercial space	1,076m ²
Maximum Height (AOD)	246.0m
Car Parking	152
Cycle Parking	642

3. Scope, Structure and Consultation

Scope

- 3.1. A scoping exercise has been carried out in order to determine the likely significant effects on the environment that may arise as a result of the Proposed Development. This process has enabled the team to determine which technical disciplines are pertinent to the Proposed Development and the scope of assessment required in order for any likely significant effects on the environment to be addressed as part of a future EIA process.
- 3.2. This process has taken account of the proposed construction activities, relevant planning policy, knowledge of the EIA Site, and the professional opinion of the project team.
- 3.3. The information presented in the ES will be provided in accordance with Schedule 4 of the EIA Regulations and will include:
 - A description of the Proposed Development;
 - An outline of the main alternatives studied;
 - A description of the aspects of the environment likely to be significantly affected by the Proposed Development;
 - A description of the likely significant effects of the Proposed Development on the environment;
 - A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment;
 - A non-technical summary; and
 - An indication of any difficulties encountered by the applicant in compiling the required information.
- 3.4. The introductory chapters of the ES will provide the following information:
 - An introduction to the ES in a legislative and EIA Site specific context;
 - Description of the EIA Site and Proposed Development;
 - Alternatives considered and project design evolution;
 - EIA methodology;
 - Construction methodology and programme;
 - Stakeholder engagement;
 - ES structure; and
 - Details of the EIA project team.
- 3.5. The geographical coverage of the EIA will be determined by a number of factors including:
 - The physical extent of work;
 - The nature of the baseline environment, including the location of sensitive receptors;
 - The distance over which effects will be significant; and
 - The presence and type of “pathways” along which impacts may be spread.

Environmental Disciplines to be Scoped Out of the EIA

- 3.6. 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 ES. An explanation for each discipline is given below.

Agricultural Circumstances

- 3.7. The EIA Site is entirely on brownfield land so there would be no effects in respect to agriculture. This discipline can therefore be scoped out of the EIA and will not be assessed as part of the planning application.

Archaeology

- 3.8. The EIA Site Area does not contain any designated heritage assets and does not lie within a Conservation Area or a registered park and garden. The EIA Site does have potential to contain below-ground archaeological remains of local significance, which may merit preservation by record if they are directly affected by the Proposed Development. Of particular interest are the 18th century buildings visible on William Green's 1787-94 Map of Manchester and Salford, and the early 19th-century back-to-back workers housing visible on the various 19th-century and early 20th-century maps. In addition, any buried remains pertaining to Manchester's Roman settlement would also merit preservation by record, although the potential for remains to survive from this period is considered to be low due to the intensive development of the area from the late 18th century onwards.
- 3.9. The scoping assessment has concluded that the Proposed Development, in the absence of any mitigation, has potential to cause minor harm to non-designated below-ground heritage assets, assuming that earth-moving works will be required across the EIA Site. Whilst there is some potential for below-ground remains of local/borough importance, it is unlikely that the predicted impact of development will be significant.
- 3.10. It is concluded therefore that archaeological issues should be 'scoped out' of an Environmental Statement.
- 3.11. It is concluded, however, that it would be appropriate, following production of the archaeological desk-based assessment reports, to undertake some intrusive archaeological investigation in advance of development. This should be targeted in particular on the sites of 18th-century buildings, early 19th-century back-to-back housing, and any areas that may have been uncellared or undeveloped and may contain remains of Roman activity, and, in the first instance, should aim to establish the presence or absence of buried remains. This approach has been agreed with the Greater Manchester Archaeological Advisory Service and a Written Scheme of the proposed changes can be predicted.

Aviation

- 3.12. From professional experience of similar scale developments nearby, PagerPower have confirmed that the Proposed Development would not give rise to aviation conflicts and appropriate mitigation can be put in place to reduce any potentially significant effects to non-significant levels subject to consultation and sign-off from NATS.
- 3.13. Whilst the Proposed Development does exceed the 90m AOD aviation safeguarding threshold that requires NATs to be consulted, the scale and location are commensurate with proposals on neighbouring EIA Sites, where no significant effects on aviation were identified. Within this context, it is expected that the proposals will not give rise to significant EIA effects with regard to aviation and is therefore proposed to be scoped out of the ES.
- 3.14. An Aviation Safety Assessment will be prepared by PagerPower and submitted as part of the application, which will be prepared in consultation with both Manchester Airport Group and National Air Traffic Services (NATS).

Historic Environment

Introduction

- 3.15. Due to the proposed height and location of the EIA Site, there is the potential for the settings of nearby heritage assets to be indirectly (visually) impacted, albeit previous planning applications for neighbouring sites have demonstrated that the SRF area is suitable for the development of buildings of a similar height and scale. The EIA Site contains no designated or non-designated heritage assets and subsequently there is no potential for any direct (physical) impact upon the built historic environment.
- 3.16. Standalone Heritage Statements will be prepared to accompany the two planning applications. This Statement will provide a detailed and robust baseline assessment of the identified designated heritage assets surrounding the EIA Site and assesses their significance. The Heritage Statement will be prepared in general accordance with or with reference to the following legislation, policy and guidance:
- Planning (Listed Buildings & Conservation Areas) Act 1990;
 - National Planning Policy Framework (NPPF) Conserving and enhancing the historic environment (2021);

- MCC Core Strategy, 2012;
- Historic England guidance: Conservation Principles Policies and Guidance (2008);
- Historic England's Good Practice Advice Note 2: Managing Significance in Decision-Taking in the Historic Environment (2015);
- Historic England's Good Practice Advice Note 3: The Setting of Heritage Assets (2017);
- Historic England's Advice Note 4: Tall Buildings (2022); and
- Historic England's Advice Note 12: Statements of Heritage Significance (2019).

3.17. The Heritage Statement will cover potential impacts to the following sensitive receptors including:

- The settings of individual identified heritage assets (through indirect visual impact).
- It is considered that for the purpose of assessing the potential impact of the proposed development upon the settings of any designated heritage assets, a 500m search area is robust. The study area has been identified utilising professional experience and having regard to the presence of the development within the townscape and character of the area. Within the 500m radius there are 23 listed buildings, one Scheduled Ancient Monument and one Conservation Area, which are detailed in Section 2 of this report.

- 3.18. The settings of any additional heritage assets, whether designated or non-designated, which have the potential to be affected by the Proposed Development, are to be incorporated into the impact assessment where necessary. It should be noted that MCC have not adopted a local list identifying non-designated heritage assets.
- 3.19. The Heritage Statement will draw upon EIA Site survey work, map regression analysis, and desk-based research to establish the baseline. This assessment will allow for eight key heritage viewpoints (to be agreed with the LPA) to be tested with the Proposed Development, in order to assess the potential visual impact.
- 3.20. Potential impacts associated with construction and operational phases of the Proposed Development will be indirect temporary visual impact and indirect permanent visual impact, respectively. However, due to the recent completion of the first phases of the Strategic Regeneration Framework (SRF), which has introduced a number of high-rise towers to the immediate north and west of the EIA Site forming the Deansgate Square residential towers and the Crown Street development, the immediate environs surrounding the EIA Site are now largely characterised by buildings of considerable height and scale. Therefore, the potential overall magnitude of change / impact upon the settings of designated heritage assets will be minor at most and not result in any significant effects upon their significance.
- 3.21. When considered against committed developments in the wider area, the overall visual impact upon the built historic environment remains largely unchanged.
- 3.22. It should be noted that the Heritage Statements submitted as part of previous applications for the Deansgate Square development to the east of the EIA Site (PP Ref: 111719/FO/2016/C1), Crown Street development to the north-west of the EIA Site (PP Ref: 119806/FO/2018) and Crown Street Phase 2 (126668/FO/2020), demonstrated there would be no significant impact upon any identified designated heritage assets. Whilst each Proposed Development has to be evaluated individually, the EIA Site is located within an area already characterised by tall buildings of considerable height and scale, which are unique to this area and differing from the wider townscape.
- 3.23. As such, the Proposed Development would be expected to, at most, result in limited instances of minor adverse impact. It is therefore considered that the Proposed Development would not incur any significant effects on the historic built environment resource, and therefore it is concluded that the historic environment can be scoped out of the EIA, instead, a stand-alone Heritage Statement considering the impact of the Proposed Development will be submitted. For that reason, heritage is scoped out of the EIA.

Ecology

- 3.24. ERAP Ltd (Consultant Ecologists) has carried out a desktop study and relevant ecological surveys (Phase 1 Habitat Survey, invasive plant species survey and daylight licensed bat survey and assessment) to inform the preparation of an Ecological Survey and Assessment. The report will be submitted alongside the planning application and details the results of the surveys undertaken at the Site and recommendations in relation to the Proposed Development.
- 3.25. The Site comprises hard-standing with boundary vegetation, amenity grassland and ornamental planting and buildings. The Site has no statutory or non-statutory designation for nature conservation. Likely significant effects of the Proposed Development on the Sites of Special Scientific Interest (SSSI), located 8 to 10 kilometres from the Site are avoided.
- 3.26. The Site contains only common and widespread plant species. None of the habitats present are representative of semi-natural habitat or Priority Habitat.
- 3.27. The boundary vegetation provides habitat suitable for use by nesting for birds. The office building within the site is assessed to be of 'low' suitability for use by roosting bats, and one bat activity survey is recommended in the bat activity season to determine the status of roosting bats at the site. Otherwise, the presence of protected species at the Site is reasonably discounted.
- 3.28. The assessment concludes that there are no significant ecological constraints on the Proposed Development and an adverse effect on designated sites, protected species and ecologically valuable habitats is avoided. As such Ecology can be scoped out of the EIA.

Flood Risk

Assumptions and Limitations

- 3.29. This assessment will be based on desktop information and surveys. The desktop information is from data available online via the Government Flooding Maps for Planning Portal, MCC Strategic Flood Risk information and British Geological Survey data. Limitations may exist as information is strategic, non-intrusive and not EIA Site specific.
- 3.30. Topographical and Drainage Surveys will be undertaken to inform the EIA Site design along with intrusive Site investigation. The level of information available may be limited depending on the accessibility and coverage of investigations.

Consultation

- 3.31. Considerations of the drainage strategy including the point of discharge and the restriction on discharge will be confirmed through the Pre-development enquiry process with both Manchester Lead Local Flood Authority (LLFA) and United Utilities (UU).
- 3.32. At the time of writing, one meeting had been held with UU to discuss foul and surface water drainage. Discussions were ongoing regarding the locations of connections and permitted discharge rates.
- 3.33. A predevelopment inquiry was sent to the LLFA on the 14th of November 2022, to confirm acceptable surface water runoff rates from the EIA Site.

Assessment Methodology

The Study Area

- 3.34. The assessment of flood risk and drainage will extend to cover the full development footprint from both Crown Street Phase 3 and Plot D. The full EIA Site footprint including works to the adjoining road is subject to development and will be assessed both in regard to impact on flooding and also as part of the restriction on the discharge of Surface Water, which will be applied to the full catchment area under the requirements of MCC's planning policies.

Baseline Surveys and Assessment

- 3.35. The EIA Site is approximately 1.5 hectares in size and within Flood Zone 1 from Environment Agency mapping, indicating that the risk of flooding from rivers and sea is low.
- 3.36. The nearest watercourse to the development is the River Medlock and its confluence with the Bridgewater Canal which is located some 75m away from the development eastern boundary.
- 3.37. The EIA Site is in excess of 0.5 hectares and is located within the Conurbation Core Critical Drainage Area, therefore a Flood Risk Assessment will be required to be undertaken. The Flood Risk Assessment will assess all potential sources of flooding including tidal, fluvial, surface water, groundwater, sewers and infrastructure failure. The Flood Risk Assessment will also include the predicted impact of climate change on flood risk.
- 3.38. The Flood Risk Assessment scope will be undertaken in accordance with National Planning Policy Framework document (NPPF) which provides technical guidance on how flood risk should be assessed during the planning and development process. The intention is to ensure that development-planning decisions are made in a manner that delivers sustainable development in terms of current and future flood-risk.
- 3.39. As the EIA Site is considered to be 'major' development by the Town and Country Planning Order 2015, a Drainage Strategy will also be required as part of the Planning Application for the development.
- 3.40. A comprehensive drainage strategy for both foul and surface water will be developed, incorporating Sustainable Drainage Systems (SuDS) where suitable, in accordance with local policy requirements.
- 3.41. The Drainage Strategy will also consider the impacts of climate change and provide the necessary capacity within the drainage system to accommodate the predicted increase in rainfall for the development life span.

Potentially Significant Effects

3.42. From review, the following potentially significant effects have been considered and scoped out of the EIA:

Table 4 Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Proposed development EIA Site and the EIA Site end user.	Flooding from the River Medlock reaching the EIA Site, risk to the end user	The EIA Sites are both located within flood zone 1 and are therefore protected from flooding for storm events in excess of the 1:1000-year event. The risk is therefore defined as Very Low	Both Crown Street Phase 3 and Plot D	Out
Wider Catchment Area	Flooding caused by surface water discharge from the development, risk to occupants in the wider area.	The discharge limits for surface water from the development EIA Site will be restricted through liaison with the LLFA and UU. The restriction will be based on either 50% betterment over the current condition or Urban Greenfield run-off which will have a betterment over the existing of more than 50%. Betterment through the design will reduce the risk of flooding to the wider catchment area.	Both Crown Street Phase 3 and Plot D	Out
Local Watercourses	Damage to water quality and wildlife through pollution during construction and operation	The EIA Site will drainage via separate sewer networks and the surface water network will include the use of SuDS which will act to treat surface water prior to discharge. The point for surface water will be to the network of combined sewer which as a result will mean the water is then treated through the processes within an adopted treatment plant before discharge to watercourse. During construction surface water generated from the EIA Site will be managed as part of the contractors CEMP which will be signed off in advice by the Local Authority and where applicable the EA.	Both Crown Street Phase 3 and Plot D	Out
Existing Sewer Infrastructure	Negative impact on the capacity of the adopted sewer network through the discharge of foul water and surface water from the development	The discharge limits for surface water from the development EIA Site will be restricted through liaison with the LLFA and UU. The restriction will be based on either 50% betterment over the current condition or Urban Greenfield run-off which will have a betterment over the existing of more than 50%. Betterment through the design will result in additional capacity being available in the surrounding adopted sewer network	Both Crown Street Phase 3 and Plot D	Out
Groundwater	Damage to water groundwater quality through pollution during construction and operation	Post development the EIA Site will be 100% impermeable and will be served by a positive drainage network which will collect the surface water at source, attenuate as necessary before discharging it to the adopted sewer network. Infiltration of surface water is not suitable as a method of disposal due to the limitation on space on EIA Site and likelihood that ground conditions in the location of the development will be Manchester Clay's which have very poor infiltration rates	Both Crown Street Phase 3 and Plot D	Out

Ground Conditions

- 3.43. WSP UK Ltd has undertaken the following scoping of ground conditions with respect to potential impacts on the environment from the Proposed Development.
- 3.44. The scoping identifies baseline contaminated land and ground conditions on the site and assesses the potential impacts on the environment from the proposed development.

Assumptions and Limitations

- 3.45. The scoping of ground conditions has been undertaken in part based on information provided by third parties. Information provided by others has been taken in good faith as being accurate. WSP cannot and will not accept liability for any deficiencies in third party information.

Baseline Surveys and Assessment

- 3.46. The following surveys and assessments have been undertaken for the site:
- RoC Consulting Ltd, Phase 1 Desk Study – Crown Street Phase 3, Ref. JB/AS/P1/3678, 29 June 2017 (covering eastern portion of the Phase 3 site)
 - GeoAssist Ltd, Phase I Desk Study and Preliminary Contaminated Land Risk Assessment – Crown Street - Zone 3, Great Jackson Street, Ref. 5894/GRL V1.00, November 2017 (covering area of the marketing suite to the west of Great Jackson Street)
 - Ramboll, Owen Street Marketing Suite – Contaminated Land Report, Ref. 1620004981, 04 October 2018 (ground investigation and tank removal exercise in area of former fuel station to the west of Great Jackson Street)
 - Zetica Ltd, UXO Pre-Desk Study Assessment – Crown Street, Manchester, Greater Manchester, 20 February 2023
 - WSP UK Ltd, Crown Street Phase 3, Manchester – Geo-environmental Preliminary Risk Assessment, Ref. 70059549_12063, March 2023.
 - A Phase 1 desk study and preliminary contaminated land risk assessment was prepared for the site by GeoAssist Ltd in 2016¹. The assessment was undertaken to inform a proposed development of the Plot D site as a temporary concrete batching plant.
 - In addition, a review of publicly available records provided by the British Geological Survey (BGS)² and the Coal Authority³ has been undertaken by WSP to inform the scoping.

¹ GeoAssist Ltd, Phase I Desk Study and Preliminary Contaminated Land Risk Assessment – 3M Site, Great Jackson Street, Manchester, Ref. 5818/RMS V1.00, August 2016

² BGS GeoIndex Viewer accessed via <http://mapapps2.bgs.ac.uk/geoindex/home.html>

³ Coal Authority Interactive Map viewer accessed via <https://mapapps2.bgs.ac.uk/coalauthority/home.html>

Base Line Conditions

Phase 3

- 3.47. During a site walkover undertaken as part of the WSP Geo-environmental Preliminary Risk Assessment (PRA) in February 2023, the western portion of the site adjacent to Great Jackson Street was noted as recently developed with a two-storey contemporary building used as a marketing suite. The area to the west of the marketing suite is used for storage of site cabins for the adjacent Crown Street Zone 2 development. A three-storey office building is located in the northwest of the site, north of the present marketing suite. The eastern half of the site (east of Great Jackson Street) was noted as vacant land comprising concrete hardstanding across the footprint of a former warehouse building, tarmac and some soft landscaping.
- 3.48. Adjacent land uses comprise:
- Commercial buildings and a car park to the north
 - Multi-storey residential buildings across Owen Street to the east.
 - A commercial building and storage yard to the south-east
 - A temporary concrete batching plant across Melbourne Street to the south (Plot D site)
 - Multi-storey residential buildings under construction to the north-west and west
- 3.49. The earliest historical Ordnance Survey (OS) mapping from 1908 indicates that residential terraced houses were present across the entire site on both sides of Great Jackson Street, which crosses the site at the centre. Most of the residential buildings are no longer shown on maps from 1948-1954. By 1954 a garage is shown in the western part of the site to the west of Great Jackson Street, with a works in the west by 1960. Maps from 1960-1980 show buildings associated with the Knott Mill engineering works in the south-east of the site. Two depot buildings are shown to occupy the site between the garage and Crown Street on maps from 1969-1988. Maps from 1984-1990 show a building comprising four separate units occupying the eastern half of the site. These buildings appear to have remained until recently demolition. The most recent maps included in the third-party desk studies from 2000 still show the garage and the two depots in the western half of the site.
- 3.50. The area surrounding the site was formerly predominantly residential, becoming increasingly industrial/commercial after the 1950s. Residential buildings are present immediately to the west, north and south of the site in the mid-19th century. The Knott Mill iron works (later labelled automobile engineering works) are present ca. 10m to the east of the site across Owen Street. By 1948, engineering works are shown 10m to the north, and a mill and starch works ca. 50m to the north-west. By 1969, the A57 is shown ca. 60m to the south of the site; engineering works and warehouses are shown 15m to the west. By 1972, a warehouse is shown on the Plot D site ca. 20m to the south. The Knott Mill works to the east are no longer shown by 1985.
- 3.51. The ground conditions beneath the site are anticipated to comprise Made Ground to depths between 1.5m to 3.0m bgl, locally greater than 4.0m bgl, likely to include demolition type materials. The natural superficial deposits directly beneath the Made Ground are likely to comprise relatively permeable silts, sandy clays and gravels (Glaciofluvial Sheet Deposits), potentially underlain by less permeable cohesive (clay) deposits. Solid strata are indicated to comprise sandstone of the Chester Formation from a depth of ca. 7-8m bgl.
- 3.52. Hydrocarbon odours were encountered within Made Ground and natural superficial deposits in five exploratory holes within the footprint of the former fuel station, suggesting that localised hydrocarbon impact may be present in this area.
- 3.53. The site is not indicated to be located in a Development High Risk Area as defined by the Coal Authority. No mine entries are recorded within at least 500m of the site. The site is not shown to be underlain by recorded or probably coal mine workings. The reviewed coal mining reports included in the third-party desk studies do not record the site to be in area that could be affected by underground mining.
- 3.54. The Glaciofluvial Sheet Deposits are classified as a Secondary (A) Aquifer. The underlying Chester Formation is classified as a Principal Aquifer.
- 3.55. The River Medlock is located 80m to the east and 135m to the north of the site, which is connected to the Bridgewater Canal/ Rochdale Canal and the River Irwell to the north.
- 3.56. There are no active surface water or groundwater abstraction licenses recorded within 250m of the site. The site is not located within a Source Protection Zone.
- 3.57. There are no environmentally sensitive or designated sites recorded within 1km of the site.

Plot D

- 3.58. During a site walkover undertaken as part of the GeoAssist desk study in 2016, the Plot D site was encountered as disused and covered with concrete hardstanding. A commercial building and a small electrical transformer were noted. A second site walkover was undertaken by WSP on 24 February 2023. During the site walkover the site was observed to be occupied by a temporary concrete batching plant.
- 3.59. Historical Ordnance Survey (OS) mapping indicates that the site was occupied with residential buildings from the earliest available records (1908) until the mid-1960s. A warehouse building is shown to occupy the centre of the site from 1977.
- 3.60. The site is shown on the earliest available records to be located in a mixed residential/ industrial/ commercial area. An iron works (Knott Mill) is shown ca. 90m to the north-east of the site from 1908. The works are shown to have extended to within ca. 20m to the north-east of the site by 1948. A corporation yard and printing works are located ca. 90m and 200m to the north-east. A fuel station is shown ca. 100m to the north from 1951. Works are shown ca. 50m to the north by 1965 which later change to depots. Mancunian Way is constructed along the southern site boundary by 1965.
- 3.61. Geological mapping published by the BGS indicates the site to be underlain by fluvio-glacial deposits and Glacial Till with a thickness between 4-9m. Solid strata are indicated to comprise sandstone of the Chester Formation. The reviewed BGS records do not indicate the presence of Made Ground. Made Ground is however anticipated on the site associated with historical development and land uses.
- 3.62. A Coal Authority coal mining report obtained for the site does not indicate the presence of shallow or deep coal mine workings beneath the site. The site is not indicated to be at risk from ground movements associated with coal mining.
- 3.63. The Glaciofluvial Deposits are classified as a Secondary (A) Aquifer whilst The underlying Chester Formation is classified as a Principal Aquifer.
- 3.64. The River Medlock is located 143m to the north-east of the site, which is connected to the Bridgewater Canal/ Rochdale Canal and the River Irwell to the north.
- 3.65. There are no active surface water or groundwater abstraction licenses recorded within 250m of the site. The site is not located within a Source Protection Zone.
- 3.66. There are no environmentally sensitive or designated sites recorded within 1km of the site.
- 3.67. The GeoAssist desk study assesses the following risks to the proposed use of the Plot D site as a temporary concrete batching plant:
- Low risk from ground contamination associated with Made Ground deposits and former on-site or off-site land uses
 - Low risk from hazardous ground gases arising from on-site or off-site Made Ground deposits, or from underground coal mine workings
 - Low risk from geotechnical hazards associated with underground mine workings or ground stability
 - Low risk from unexploded ordnance on the site.

Potential Effects

- 3.68. The baseline surveys and assessments undertaken for the site have identified potential sources of contamination within soil and groundwater beneath the site. It is assumed that the proposed development (multi-storey residential buildings with basement structures) will require significant excavations on the site that will remove most of the Made Ground that is anticipated on the site. The proposed development is therefore considered to remove/reduce the principal source of potential contamination on the site.
- 3.69. Mitigation of residual effects is ensured by the planning process and is managed by appropriate planning conditions relating to ground conditions and contaminated land.
- 3.70. As part of the planning process, further Phase 2 ground investigation works will be required prior to redevelopment of the site. The Phase 2 ground investigation will be designed to confirm the anticipated ground conditions, to assess the identified potential source-pathway-receptor contaminant linkages and to inform the design of the proposed development. The Phase 2 ground investigation will produce an updated conceptual site model which will refine the source-pathway-receptor contaminant linkages and will provide recommendations for possible remedial measures where required.

- 3.71. Where residual risks to receptors is identified an appraisal of remediation options and preparation of a remediation strategy in accordance with Land Contamination Risk Management (LCRM)⁴ will be required to discharge planning conditions.
- 3.72. Potential effects are summarised in the table below.

Table 5 Potential Effects

Receptor	Effect	Discussion of Effect	Development Phase	Scoped In/ Out
Construction workers and site neighbours	Exposure to contaminants of concern within soil or groundwater	Construction workers and site neighbours may be exposed to contaminants of concern in soil or groundwater during earthworks; however, an assessment of risks to human health or environmental receptors will be required as part of the planning process, and remedial measures will be required where unacceptable risks have been identified. The implementation of a Construction Environmental Management Plan (CEMP) will be required as part of the planning process which will set out mitigation measures to prevent exposure of construction workers and adjacent site users to contaminated soil or groundwater.	Construction	Out
Controlled waters (surface watercourses and aquifer)	Liberation of mobile/ leachable contaminants of concern	Mobile/ leachable contaminants present on the site may be released into the environment as a result of construction works. As above, the planning process requires an assessment of risks from contaminated land, and the specification of remedial measures where necessary, prior to redevelopment. In addition, planning conditions will require the specification of mitigating measures in case of encountering unexpected contamination during construction.	Construction	Out
Future site users	Exposure to contaminants of concern within soil (including hazardous ground gases) or groundwater	Future site users may come into contact with contaminants of concern in soil or groundwater that remain on the site following redevelopment. Any unacceptable risks to future site users identified by future assessments of the site will require remedial measures to satisfy planning conditions. Any remedial measures will require implementation and verification in accordance with an approved remediation strategy.	Operation	Out

⁴ Environment Agency, Land Contamination Risk Management (LCRM, October 2020, updated April 2021)

Conclusion

- 3.73. The proposed development is not anticipated to result in potentially significant effects to the environment, and ground conditions can be scoped out from further environmental impact assessment.

Television, FM Radio and DAB Radio Reception

- 3.74. The Proposed Development does not include any radio or signal transmitting equipment. In response to the requirements of MCC's validation criteria, a baseline television survey will be prepared by Pager Power and will be submitted in support of the application.
- 3.75. If an adverse effect on TV services occurs following construction of the Site and is attributable to the development, various measures have been identified to mitigate any effects. The mitigation measures are capable of being implemented before the development is occupied.
- 3.76. It is not anticipated that there will be significant EIA impacts on television or radio signals in the area as a result of the Proposed Development; therefore, television and radio effects are proposed to be scoped out of the ES. A TV reception Survey will be prepared and submitted as part of the planning application.

Climate Change Vulnerability

- 3.77. WSP have assessed the vulnerability of the project to climate change (climate vulnerability assessment and green house gases) and likely significant impacts of climate change on the Proposed Development.
- 3.78. Considering a project's impact on climate is a requirement of the 2014 amendment to the Environmental Impact Assessment (EIA) Directive (2014/52). The Directive has been fully transposed into UK law in the EIA Regulations. The EIA Regulations require:
- "The EIA must identify, describe and assess...the direct and indirect significant effects of the proposed development on...climate" (Regulation 5(2)).
 - "A description of the likely significant effects of the development on the environment resulting from... the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change"(paragraph 5 of Schedule 4).
- 3.79. The green house gases assessment covers "the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions)".
- 3.80. Whilst the climate vulnerability assessment covers "the vulnerability of the project to climate change".
- 3.81. Climate Change green house gases have been scoped in for EIA, while climate vulnerability has been scoped out.
- 3.82. The detailed assessment can be found in Section 5

Scoping Summary

- 3.83. Table 6 provides a summary of the scoping exercise undertaken and what disciplines will be considered within the EIA and which are proposed to be scoped out of the EIA (and subject to a standalone technical report).

Table 6 EIA Scoping Summary

Discipline	ES Chapter	Non-EIA Assessment	Consultant
Agricultural Circumstances	N	N	n/a
Air Quality	Y	N	Enzygo
Archaeology	N	Y	University of Salford
Aviation	N	Y	Pager Power
Heritage	N	Y	Stephen Levrant: Heritage Architecture Ltd.

Discipline	ES Chapter	Non-EIA Assessment	Consultant
Climate Change	Y	N	WSP
Daylight, Sunlight and Overshadowing	Y	N	GIA
Ecology	N	Y	ERAP
Television, FM Radio and DAB Radio Reception	N	Y	Pager Power
Human Health	Y	N	Eskogen
Flood Risk and Drainage	N	Y	Curtins
Ground Conditions	N	Y	WSP
Noise and Vibration	Y	N	Fisher Acoustics Ltd
Socio-Economic Issues	Y	N	Eskogen
Solar Glare	Y	N	GIA
Townscape and Visual Impact	Y	N	Chris Burnett
Traffic and Transport	Y	N	Curtins
Wind Microclimate	Y	N	WSP

Cumulative Effects Assessment

- 3.84. An assessment of the cumulative effect of the Proposed Development and other committed developments within a defined radius of the EIA Site - including those with recent Planning Permissions and reasonably foreseeable to come forward in the near future - will be undertaken as part of the EIA.
- 3.85. There is no agreed / standard threshold for how far the assessment should go; therefore, a professional judgement has been taken regarding which schemes to highlight, taking into consideration the surrounding context of the EIA Site.
- 3.86. Where the construction of schemes has commenced then these will be treated as part of the baseline and not as committed developments.
- 3.87. Full details of the committed developments to be included as part of the cumulative effects assessment are set out at Appendix 2. Each consultant will use this and advise on any changes to methodology required as part of their topic.
- 3.88. The Applicant seeks the agreement from the LPA to the scope of committed developments and invites guidance on any additional schemes not listed.

Consultation

- 3.89. The following statutory consultees should be consulted through the EIA Scoping process:
- MCC – Contaminated Land, Environmental Health, Flood Risk, Highways, Tree Officer (Technical Officers);
 - Transport for Greater Manchester (TfGM);
 - Environment Agency (EA);
 - Canal and River Trust;
 - Greater Manchester Police Secure by Design;
 - Historic England;

- Greater Manchester Archaeological Advisory Service;
- Manchester Airport Safeguarding;
- Natural England;
- NATS;
- Greater Manchester Ecological Unit; and,
- United Utilities.

3.90. We would be grateful for confirmation of which stakeholders have been consulted as part of the Scoping Opinion

4. Proposed EIA Methodology

- 4.1. The EIA would assess both the construction and operational phases of the Proposed Development.
- 4.2. The ES would comprise two volumes, the first of would set out the findings with respect to each of the environmental disciplines that have been examined as part of the EIA. Volume 2 would include all the supporting documents and technical appendices relating to the chapters. A Non-Technical Summary (NTS) would be produced and form a standalone document.
- 4.3. Each ES chapter would follow the headings set out below to ensure the final document is transparent, consistent, and accessible.
- Introduction;
 - Assumptions and Limitations;
 - Legislative and Policy Context;
 - Assessment Methodology and Significance Criteria;
 - Baseline Conditions;
 - Identification and Evaluation of Likely Significant Effects;
 - Cumulative Effects;
 - Mitigation Measures;
 - Residual Effects; and
 - Monitoring.
- 4.4. Each chapter sub-heading is explained in further detail below.
- 4.5. A reference list will also be provided as relevant with each ES chapter.

Introduction

- 4.6. This section will introduce the assessment discipline and the purpose for which it is being undertaken.

Assumptions and Limitations

- 4.7. This section should set out any assumptions made in the assessment including potential limitations to the information used.

Legislative and Policy Context

- 4.8. This section will include a summary of national, regional, and local policies and guidance of relevance to the environmental discipline and assessment. Relevant legislation will be summarised where applicable.

Assessment Methodology and Significance Criteria

- 4.9. This section will provide an explanation of methods used in undertaking the technical study with reference to published standards, guidelines, and best practice. The application of significance criteria will also be discussed.
- 4.10. It will also outline any difficulties encountered in compiling the required information.

Baseline Conditions

- 4.11. This will include a description of the environment as it is currently and as it is expected to change given the project were not to proceed (i.e. 'do-nothing' scenario). The method used to obtain this information will be clearly identified. Baseline data will be collected in such a way that the importance of the particular subject area to be affected can be placed in its context and surroundings so that the effects of the proposed changes can be predicted.

Identification and Evaluation of Likely Significant Effects

- 4.12. This section will identify the likely significant effects on the environment resulting from the Proposed Development.

- 4.13. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the effects can be positive or negative. The criteria to be used in carrying out this process are detailed below; it should be noted that these tables provide a standardised set of criteria, which may not be applicable to all technical disciplines considered within the EIA – where relevant, individual consultants may use a variation of the criteria and this will be clearly explained within the methodology.

Prediction of Impact Magnitude

- 4.14. The methodology for determining the scale or magnitude of change caused by the impact is set out in Table 7.

Table 7 Methodology for Determining Impact Magnitude

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

Prediction of Receptor Sensitivity

- 4.15. The sensitivity of a receptor is based on the relative importance of the receptor using the scale set out in Table .

Table 8 Methodology for Determining Sensitivity

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

Assessment of Impact Significance

- 4.16. The significance of an environmental impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The Impact Significance Matrix is set out in Table 9. The asterisk denotes sensitivity that is considered to be significant – those without an asterisk are considered to not have an impact that is classed as significant.

Table 9 Impact Significance Matrix

Magnitude	Sensitivity		
	High	Medium	Low
Major	Major *	Major *	Moderate *
Moderate	Major *	Moderate *	Minor
Minor	Moderate *	Minor	Negligible

Magnitude	Sensitivity		
	High	Medium	Low
Negligible	Minor	Negligible	Negligible

Mitigation Measures

- 4.17. Adverse effects will be considered for mitigation and specific mitigation measures put forward, where practicable. Mitigation measures considered may include modification of the project, compensation, and the provision of alternative solutions as well as pollution control. The extent of the mitigation measures and how these will be effective will be discussed. Where the effectiveness is uncertain or depends upon assumptions about operating procedures, data will be introduced to justify the acceptance of these assumptions.
- 4.18. The approach to mitigation will follow best practice guidance, which suggests a hierarchical approach. The UNEP EIA Training Resource Manual (2002) advises that impacts should ideally be:
- Avoided; if not
 - Minimised; and/or
 - Compensated.
- 4.19. Three 'types' of mitigation are characterised in IEMA's Special Report – The State of Environmental Impact Assessment Practice in the UK (2011):
- EIA influence at design stage;
 - Standard construction practices for minimising effects; and
 - Follow-up actions for implementation post-consent.
- 4.20. Clear details of when and how the mitigation measures were carried out, or will be carried out, are to be given within the Environmental Statement. When certainty of impact magnitude and/or effectiveness of mitigation over time exists, monitoring programmes will be proposed to enable subsequent adjustment of mitigation measures, as necessary.
- 4.21. The opportunity for enhancement measures will also be considered where appropriate.

Cumulative Effects

- 4.22. Two types of cumulative effect will be assessed:
- **Type 1** - Cumulative effects are the interactions between effects of the construction and development works on a single receptor.
 - **Type 2** - Cumulative effects are those that arise from incremental changes caused by other past, present or reasonably foreseeable actions together with the construction and development works.
- 4.23. The cumulative effects of the Proposed Development and the identified committed developments will be assessed. A list of known committed developments is set out at Appendix 2. The Council are requested to review and comment on this list in their Scoping Opinion.

Residual Effects

- 4.24. The residual effects, i.e. the effects of the Proposed Development assuming implementation of proposed mitigation, will be determined. The residual effects represent the overall likely significant effect of the Proposed Development on the environment having taken account of practicable/available mitigation measures.

Phasing and Delivery

- 4.25. The Applicant require that the future planning permissions be capable of phased delivery. This will facilitate a more efficient delivery of the scheme by streamlining the information required prior to the discharge of conditions pre-commencement on a particular phase of works. The assumption is made that each phase will follow sequentially and without overlap.

Phasing References

- 4.26. The phasing strategy is defined as:

- Phase 1: Plot D2 Office Building
- Phase 2: Crown Street Phase 3 Plot E2
- Phase 3: Crown Street Phase 3 Plot E1
- Phase 4: Crown Street Phase 3 Plot C8
- Phase 5: Crown Street Phase 3 Plot C7
- Phase 6: Plot D1 Residential Tower

4.27. The above represents the current and most likely phasing sequence. However, the Applicant requires flexibility regarding the delivery of Phase 1. All consultants will therefore consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. In this respect, Phase 1 is being considered as a 'floating' phase, which could be delivered at any stage in the above sequence.

Environmental Impact Assessment modelling scenarios

4.28. As a result of the proposed phasing, it will be necessary to test a number of scenarios within the Environmental Impact Assessment. This is to ensure robustness that all impacts that may arise as a result of partial delivery of the proposals (due to phasing) are assessed.

4.29. The EIA scenarios are:

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

4.30. The consultant team will advise on what scenarios are to be tested for their respective technical chapters, in terms of testing the potential for 'worst case'.

5. Environmental Statement Chapters

- 5.1. Under each section topic, a summary of the content of the section, the methodology and scope of assessment is given. Where relevant, the assumptions of the assessment are described. Current relevant legislation or recognised guidance for individual assessments will be adhered to, where necessary.
- 5.2. The following Chapters are considered in turn:
- Air Quality;
 - Climate Change – Green House Gas;
 - Daylight, Sunlight and Overshadowing;
 - Solar Glare;
 - Human Health
 - Noise and Vibration
 - Townscape and Visual Impact
 - Traffic and Transport;
 - Wind Microclimate; and
 - Socio-economic.

Air Quality

Introduction

- 5.3. This Chapter of the ES will be prepared by Enzygo Consultants and assesses the likely air quality impacts of the proposals upon the EIA Site and surrounding area. This Chapter will also describe the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted. This Chapter will consider the following impacts:
- Fugitive dust emissions during construction,
 - Road vehicle exhaust emissions during operation; and
 - Pollutant exposure across the EIA Site during operation.
- 5.4. The author of this scoping methodology has over 7 years' experience preparing air quality ES Chapters for a wide range of sectors and clients and is a member of the Institute of Air Quality Management (IAQM).

Assumptions and Limitations

- 5.5. A number of assumptions will be applied during the preparation of the chapter and concern the choice and accuracy dispersion model input data, alongside baseline data sources provided DEFRA and MCC. Such limitations can be associated with a variety of factors, including:
- Model uncertainty - due to model limitations;
 - Data uncertainty - due to errors in input data, including emission estimates, operational procedures and meteorology;
 - Model input parameters – including choice of roughness length, minimum Monin Obukhov values; and
 - Variability - randomness of measurements used.

- 5.6. In order to reduce the uncertainty, modelling has been carried out following guidance set out in LAQM (TG22) and where appropriate applies worse case assumptions. Regarding model uncertainty the chosen model, ADMS-Roads 5, is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible. ADMS-Road is also commonly accepted by local authorities, DEFRA and the Environment Agency.
- 5.7. Regarding data uncertainty and variability the following inputs have been reviewed and where applicable commentary has been provided to discuss how a robust assessment will be prepared. These included the following:
- Meteorological data - modelling was undertaken using 2019 hourly average meteorological data from Manchester Airport. This station is considered the most representative to reflect local meteorology. Data is also obtained from an established distributor of meteorological data within the UK.
 - Construction Phase – inputs for the risk assessment will be based on professional judgment and will apply worse case assumption throughout, including assumptions on soil types, receptor classifications, HGV moments and construction volumes.
 - Operational Phase Receptor locations - worse case locations across the affected traffic network will be modelled, this will include receptors at signalled road junctions and known slow down sections. A review of baseline conditions will be undertaken to ensure the accurate background concentrations are applied at each receptor location.
- 5.8. Modelling predictions will be verified against local monitoring data in accordance with LAQM (TG22). The model verification process produces an adjustment factor which where necessary is applied modelling predictions to ensure inaccuracies are reduced as far as possible

Legislative and Policy Context

- 5.9. The following legislation and policy documents will be considered and adhered to during the preparation of the Air Quality Chapter.

Legislation

- European Union (EU) Directive 2008/50/EC - which came into force on 11th June 2008 and consolidates previous legislation 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 (PM2.5).
- 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.
- 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. 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.
- 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.

National Planning Policy and Guidance

- 5.10. The Chapter will also be undertaken in accordance with a number of guidance documents, to inform the assessment methodology. These are detailed below
- The National Planning Policy Framework (NPPF) – sets out the Government's core policies and principles with respect to land use planning, including air quality. The document focuses upon the protection of the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from unacceptable levels of air pollution. It stresses the importance of achieving compliance with relevant limit values or national objectives for pollutants, as well as the implementation of effective mitigations to tackle development impacts. (updated July 20th, 2021)
 - The National Planning Practice Guidance (NPPG) - launched by the Department for Communities and Local Government to support the NPPF. The air quality chapters were produced on 6th March 2014 (updated 1st November 2019).

- 5.11. Industry standard guidance will also be used to inform the methodology each of the identified assessment stages. This includes the following documents, which are predominantly development by the IAQM:
- Guidance on the Assessment of Dust from Demolition and Construction - IAQM (2014).
 - Land-use Planning & Development Control: Planning for Air Quality - IAQM & Environmental Protection UK (EPUK) (2017).
 - A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation EIA Sites - IAQM (2020).
 - Local Air Quality Management Technical Guidance, LAQM (TG22) - Department for Environment Food and Rural Affairs (DEFRA) (2022).

Local Planning Policy and Guidance

- 5.12. The Manchester Local Development Framework (LDF) Core Strategy was formally adopted in 2012 and provides a framework for development within the city. The LDF comprises a number of documents which set out MCC's spatial policy framework. A review of the Core Strategy indicated the following policy in relation to air quality that are considered relevant to this Chapter:
- Policy DM1: Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-

Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.
 - Policy EN16: Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within 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 T1: Sustainable Transport

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

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

- 5.13. Reference will be made to these policies during the undertaking of this air quality Chapter by assessing effects on amenity and the impacts of construction dust and road vehicle exhaust emissions on nearby existing sensitive locations and the Greater Manchester Authority AQMA.

Consultation

- 5.14. To date no consultation has been undertaken with MCC to discuss details of the assessment methodology. However, contact will be made to discuss specific modelling inputs during the preparation of the ES Chapter.

Assessment Methodology and Significance Criteria

Source of Effect

Construction Phase – Off Off-Site Fugitive Dust Impacts

- 5.15. During the construction phase of the Proposed Development there is the potential for air quality effects as a result of fugitive dust emissions associated with demolition, earthworks and construction, and track-out activities. It is proposed to assess these qualitatively in accordance with the IAQM methodology. The IAQM guidance identifies specific control measures to be implemented which aim to reduce residual fugitive dust impacts.

- 5.16. The guidance document is widely regarded as an example of best practice and results are accepted throughout the UK.

Construction Phase – Off-Site Road Vehicle Exhaust Emissions Impacts

- 5.17. Road exhaust emissions from construction phase vehicles will also be considered to assess potential human health impacts due to increased NO_x, PM₁₀ and PM_{2.5} concentrations during construction phase vehicle movements. The assessment threshold specified in the EPUK and IAQM guidance, as provided below, will be used to determine the requirement for a full assessment:
- “A change of HDV flows of more than 25 AADT within or adjacent to an AQMA”*
- 5.18. Should anticipated traffic generation fall below the above criteria, road vehicle exhaust impacts associated with the construction phase are considered not significant and can be screened out of the ES Chapter.
- 5.19. Conversely, should the criteria be exceeded it may be deemed necessary that further assessment is required. This will be undertaken using ADMS Roads dispersion modelling software. If an assessment is necessary, development phases will be assessed cumulatively.

Operation Phase – On- Site Impacts

- 5.20. The EIA Site is located close to major road vehicle exhaust emission sources, including the A56 and A57(M), and like the majority of Manchester City Centre is within the Greater Manchester AQMA. This gives rise to potential exposure impacts across the EIA Site and may introduce future occupiers into an area of unacceptable air quality.
- 5.21. The suitability of the EIA Site with regards to future pollutant exposure is to be determined by detailed dispersion modelling and comparison with the AQOs. Dispersion modelling using the ADMS-Roads model (version 5.0) will be prepared in two stages, including model verification against local air quality monitoring results for 2019, and future year predictions during the anticipated completion year. ADMS is developed by Cambridge Environmental Research Consultants (CERC) and routinely used throughout the UK for the prediction of pollutant dispersion from road sources. The model requires various inputs including traffic flow data, emission factor inventories, and meteorological data which are detailed further in Appendix A.

Operation Phase – Off EIA Site Impacts

- 5.22. The operational phase of the EIA Site will generate additional traffic on the local road network which may cause increases in pollutant concentrations. Potential air quality impacts at existing and committed sensitive receptors within close proximity to the EIA Site will therefore be assessed on a quantitative basis. This will be undertaken by calculating nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) concentrations at sensitive locations with and without the development using the ADMS-Road's dispersion modelling software. ADMS is widely accepted by planning authorities, the EA and DEFRA.

Scenarios To Be Tested

- 5.23. The assessment of operational phase impacts will consider the following scenarios:
- Scenario 1: Existing 2019 baseline, for verification purposes against MCC and Salford City Council (SCC) ratified Air Quality Monitoring data; and
 - Scenario 13: Future baseline, plus predicted operational flows associated with Phases 1 to 6, in addition to relevant cumulative traffic flows.
- 5.24. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to Air Quality discipline and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Air Quality discipline will be testing the development as a whole.
- 5.25. With regards to associated Air Quality impacts, the worst-case scenario presented above provides an assessment of maximum anticipated development traffic generation and thus a worse-case scenario will be assessed.
- 5.26. Please note the future year (scenario 13) will be assessed in conjunction with the anticipated future baseline (should the proposal not be completed). This will allow a comparison between conditions with and without the Proposed Development in place.
- 5.27. With regards to associated impacts, the chosen scenario reflects maximum anticipated development traffic generation associated with the combination of all development phases.

The Study Area

- 5.28. The construction phase assessment extents will consider receptor locations 350 m from the EIA Site boundary and 200 m from construction vehicle routes. These extents accord with the IAQM construction guidance.
- 5.29. In terms of off-site operational impacts the extents will be dependent on the affected traffic network defined by the Transport Assessment. This is expected to include the A57(M), A56, A5103, Great Jackson Street, and City Road East. Where necessary the model will be extended to account for worst case receptor locations as well as model verification locations.
- 5.30. For on EIA Site exposure ambient concentrations will be predicted over the area, NGR: 382920, 397020 to 383720, 397540, using a single cartesian grid with a resolution of 10 m. This area ensures that future year pollutant concentrations are modelled across the entire EIA Site.

Baseline Surveys and Assessment

- 5.31. Existing air quality data and the surrounding environment will be reviewed to provide a baseline across assessment extents. The review will consist of a review of local emission sources, LAQM techniques and periodic air quality monitoring data provided by MCC and SCC. It is not intended to collect any first-hand baseline data, and the review of existing air quality conditions across the assessment extents will be based on data provided by DEFRA, MCC and SCC.
- 5.32. Traffic data will be provided by the transport consultant and if necessary, obtained from the Department for Transport.
- 5.33. With regards to committed development the following schemes will be included within the baseline data flow data. It should be noted that only schemes with anticipated traffic generation that exceeds the screening criteria⁵ provided by the IAQM have been considered further. Table 10 summarises committed developments to be included with the baseline assessment.

Table 10 Baseline Developments

ID	EIA Site Name	MCC Planning Reference	Anticipated Traffic Generation >100 AADT or 25 HGV	Scoped into Baseline Assessment
1	Deansgate Square	111719/FO/2016/C1	Yes	Yes
2.	Crown Street Phase 2	126668/FO/2020	Yes	Yes
3.	Viadux	126868/JO/2020	Yes	Yes
4.	Plot 9 First Street	132600/FO/2021	Yes	Yes
5.	10-12 Whitworth Street	111003/FO/2016/C1	No	No
6.	Trinity Islands	132429/FO/2021	Yes	Yes
7.	Arundel Street / St George's Place	123261/FO/2019	Yes	Yes

- 5.34. There are a number of cumulative developments to be considered within the future year assessment scenarios. At this stage it is unclear which developments will be scoped into assessment, and this Chapter will ultimately rely on the findings of the transport assessment. However, to provide some context Table 10¹⁰**Error! Reference source not found.** summarises committed developments expected to be included with the baseline assessment.

⁵ Light Good Vehicle Flows >100 AADT or Heavy Good Vehicle Flows >25 HGV

Table 10 Cumulative Developments

ID	EIA Site Name	MCC Planning Reference	Anticipated Traffic Generation >100 AADT or 25 HGV	Scoped into Baseline Assessment
8.	Plot H, Great Jackson Street Framework	129406/FO/2021	Yes	Yes
9.	1 Alpha Place	120113/FO/2018	No	No
10.	325 Deansgate	125804/FO/2019	No	No
11.	Hotspur Press	120635/FO/2018	Yes	Yes
12.	Plot 11 First Street	125573/FO/2019	Yes	Yes
13.	One City Road	128002/FO/2020	No	No
14.	Plot G, 34 Great Jackson Street	129273/FO/2021	Yes	Yes
15.	2-4 Whitworth Street	126308/FO/2020	Yes	Yes
16.	Bridgewater House Great Jackson Street	134694/FO/2022	No	No
17.	Plot F Great Jackson Street	132199/FO/2021	Yes	Yes

Significant Criteria Effects

5.35. Table 11 presents the AQOs for NO₂ and PM as detailed within the national AQS. These objectives will be considered further to inform on-EIA Site exposure risk as well as the significance of associated development led impacts.

5.36. Concentrations above or marginal to the AQOs below will be considered to be significant.

Table 11 National Air Quality Objectives

Pollutant	AQO Concentrations (µg/m ³)	Average 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

5.37. The significance of potential operational phase effects will be determined by analysis of the magnitude of change in pollutant concentrations and assessed the criteria provided within the EPUK and IAQM planning guidance shown in Table 12. The asterisk denotes impacts that are considered to be significant.

Table 12 Operational Traffic Exhaust Emissions – Assessment of Impact

Long Term Average Concentration	% Change in Concentration Relative to the 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*

5.38. Following the prediction of impacts at discrete receptor locations utilising the criteria set out above, the EPUK and IAQM document states that this framework is to be used as a starting point to make a judgement on the significance of impacts.

5.39. The following factors will help in determining the overall significance of the Proposed Development:

- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
- Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
- The extent to which an objective is exceeded e.g. an annual mean NO₂ concentration of 41µg/m³ should attract less significance than an annual mean of 51µg/m³.

Baseline Conditions

5.40. Available air quality data and the surrounding context was reviewed to provide a baseline for assessment. The review will consist of a review of nearby emission sources. LAQM techniques and periodic air quality monitoring data provided by MCC and SCC. Existing air quality conditions in the vicinity of the EIA Site have been reviewed and detailed below.

Emission Sources

5.41. The main sources of pollutant emissions within the vicinity of the EIA Site are road vehicle exhaust emissions associated with the A57 (Mancunian Way) and A56 (Chester Road). Both arterial routes are located within 100 m of the EIA Site, with the A57 located closest to EIA Site approximately 10 m south of Plot D. Therefore, sections of the EIA Site can be considered as being close to a significant source of road vehicle exhaust emissions.

Local Air Quality Management Areas

5.42. As required by the Environment Act (1995), the Greater Manchester Combined Authority (GMCA), on behalf MCC, has undertaken review and assessment of air quality within the city. This process has indicated that annual mean NO₂ concentrations exceed the relevant AQO at specific areas throughout the city. As such, AQMA has been declared and is described as:

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

5.43. The EIA Site is located within the GMCA AQMA. As such, there is the potential for future residents to be exposed to elevated pollutant concentrations, as well as to cause impacts within an area of existing poor air quality.

5.44. 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

- 5.45. Monitoring of pollutant concentrations is undertaken by MCC using continuous and periodic methods throughout their area of administration.
- 5.46. A review of the most recent data indicated that there is currently one automatic analyser within the vicinity of the Proposed Development. **Error! Reference source not found.**13 presents recent monitoring results, with exceedances of the relevant AQO highlighted in bold.

Table 13 Operational Traffic Exhaust Emissions – Assessment of Impact

ID	EIA Site Name	EIA Site Type	Annual Mean Concentration (µg/m ³)			
			2018	2019	2020	2021
MAN1	Manchester Oxford Road	Kerbside	62.00	59.00	36.00	44.00

- 5.47. As shown above, the annual mean AQO for NO₂ was exceeded in recent years at the Oxford Street automatic EIA Site, with the exception of 2020.
- 5.48. Exceedances are likely due to the kerbside location adjacent to an arterial road within an AQMA. As this monitoring location is classified as a Kerbside EIA Site it will only be considered further in context of the baseline assessment. This is in accordance with LAQM (TG22) which suggests that the inclusion of Kerbside location within the verification procedure may lead to an over-adjustment of modelling at roadside EIA Sites. This may then lead to inaccuracies during the modelling of potential exposure across the EIA Site and potential impacts at nearby sensitive receptor locations.
- 5.49. Caution should be made when reviewing 2020 monitoring results given the impact of COVID-19 restrictions and significant reduction to traffic volumes. This is likely an explanation for the significant reduction to annual mean concentrations during 2020 observed across the majority of locations.
- 5.50. MCC also employs passive diffusion tubes to monitor annual mean NO₂ concentrations throughout the city. A review of the latest diffusion tube monitoring data indicated three representative locations. Monitoring results from recent years are summarised in. Exceedances of the relevant AQO are shown in bold.

Table 4 MCC Diffusion Tube Monitoring Results

ID	EIA Site Name	EIA Site Type	Annual Mean Concentration (µg/m ³)			
			2018	2019	2020	2021
MA29A	Oxford Street	Roadside	58.77	55.39	39.02	44.83
MA77	Hewitt Street	Urban Background	40.99	43.66	26.92	30.76
MA82-84	Manchester Oxford Road	Roadside	52.84	51.31	33.88	40.73
MA97	Chester Road	Roadside		32.29	23.40	28.38

- 5.51. SCC also undertake Air Quality monitoring within 500 m of the EIA Site. A review of the latest data indicated two representative diffusion tube monitoring locations within the assessment extents. Recent results from these locations are shown in Table 5 14, with exceedances of the relevant AQO are highlighted in bold.

Table 5 Salford City Council Diffusion Tube Monitoring Results

ID	EIA Site Name	EIA Site Type	Annual Mean Concentration (µg/m ³)			
			2018	2019	2020	2021
MA29A	Oxford Street	Roadside	58.77	55.39	39.02	44.83
MA77	Hewitt Street	Urban Background	40.99	43.66	26.92	30.76

- 5.52. As shown in Table 43 and Table 514 there were exceedances of the annual mean AQO for NO₂ at all but one monitoring location in recent years. Exceedances are likely due to their roadside locations adjacent to arterial road networks.
- 5.53. The closest passive diffusion tube monitor, Hewitt Street (MA77), is classified as an urban background EIA Site and could provide a suitable representation of worst case background concentrations across the modelling extents.
- 5.54. Nearby roadside monitors, including Chester Road (97), Regent Road (SA60/80) are situated with 10 m of arterial traffic route and provide a strong comparison to the affected road network. It is proposed that these locations will be used within the ADMS-Roads model verification process.
- 5.55. 2019 monitoring results from locations MA97, SA60 and SA81 recorded annual mean NO₂ concentrations ranging between of 32.3 µg/m³ and **46.4 µg/m³**. A further review of nearby monitoring locations indicates that pollutant concentrations within the proposed assessment domain are well above the AQO. These results provide an indication that pollutant concentrations adjacent to the EIA Site is likely to exceed the annual mean AQO for NO₂. It is unlikely that the 1-hour mean AQO would be exceeded however, detailed modelling will be undertaken to quantify on-EIA Site pollutant exposure.
- 5.56. Similar to the Oxford Road analyser, both Oxford Street (29A) and Oxford Road (82-84) do not provide a good representation of the Site given the presence of street canyon effects as well as heavily trafficked bus routes.
- 5.57. Figure 4 provides a map of diffusion tubes within 1 km of the EIA Site.

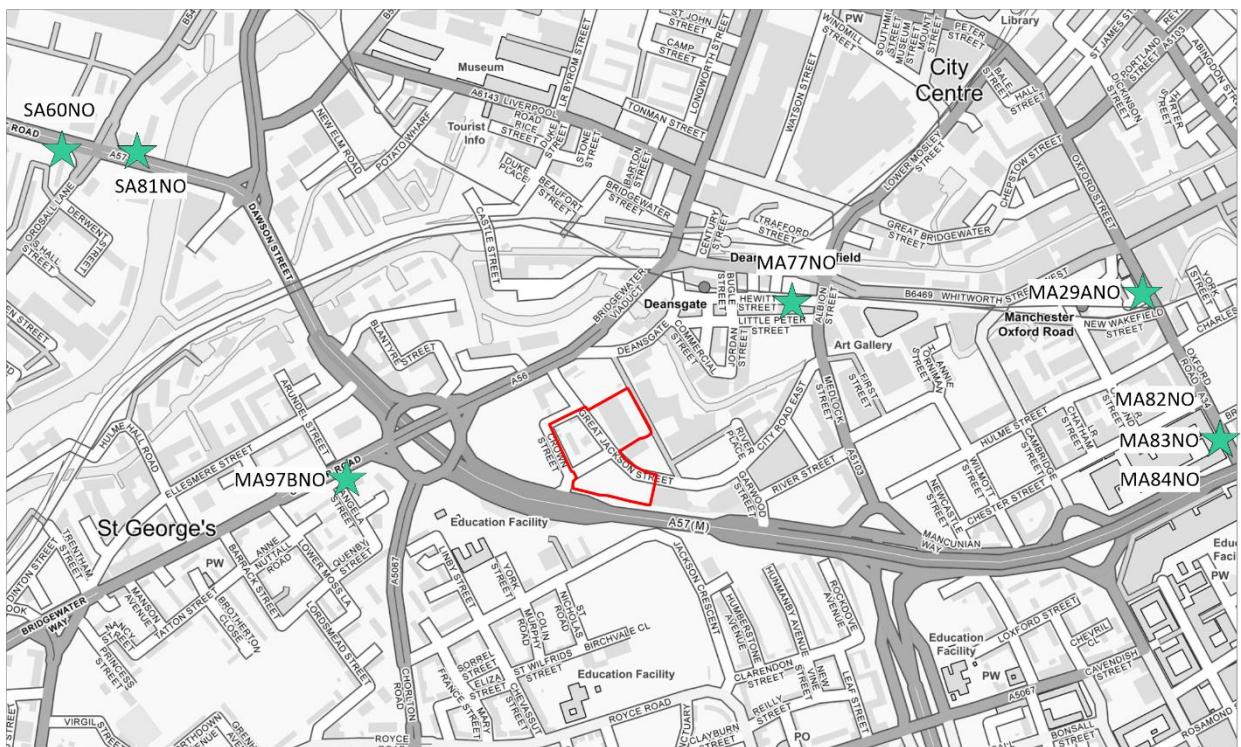


Figure 4 Diffusion tubes within 1 km of the EIA Site

- 5.58. Monitoring of particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) and 2.5µm (PM_{2.5}) is not currently undertaken by MCC or SCC in the vicinity of the EIA Site.

Background Pollutant Concentrations

- 5.59. 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 EIA Site is located in grid square NGR: 383500, 397500. Data for this location was downloaded from the DEFRA website for the purpose of this assessment and is summarised in **Error! Reference source not found.**15. 2019 is considered the most reliable baseline year post COVID restrictions.

Table 6 Predicted Background Pollutant Concentrations

Pollutant	Predicted 2019 Background Concentration ($\mu\text{g}/\text{m}^3$)
NO ₂	26.07
NO _x	39.95
PM ₁₀	13.47
PM _{2.5}	8.69

- 5.60. As shown in Table 6, background concentrations do not exceed the relevant AQOs. Comparison with the monitored data indicates the influence of road vehicle exhaust emissions upon roadside pollutant concentrations.

Review of Background NO₂ Concentrations

- 5.61. A comparison of monitored background concentrations was undertaken in the assessment area to establish the most representative conditions for the EIA Site and surrounding receptor locations. A review of the MCC and SCC monitoring data determined that Hewitt Street (MA77) is the only urban background located within the defined assessment extents. Table 7 compares measured data and DEFRA background predictions.

Table 7 - Comparison of Background Pollutant Concentrations

Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)
DEFRA	26.07
MA77	43.66

- 5.62. MA77 is exceeding the annual mean AQO for NO₂ and situated approximately 350 m northeast of the EIA Site. Whilst MA77 is classified as an Urban Background it is influenced by major sources including the A5103 and Manchester Oxford Road rail line. LAQM (TG22) suggests that there should be no major sources of pollution within 50 m of the background EIA Site.
- 5.63. As such, MA77 is not considered a true urban background EIA Site and background concentrations will be informed by DEFRA predictions as detailed in Table 7.

Potentially Significant Effects

- 5.64. Table 817 provides a summary of potential effects which would be assessed within the air quality ES chapter.

Table 8 Summary of Assessment Scope

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Existing Human Receptors (within 350m of the EIA Site boundary)	Nuisance and disturbance as a result of dust from construction activities	Construction activities have the potential to result in nuisance and or adverse health effects due to dust deposition arising from on-EIA Site construction activities, resulting in the soiling of surfaces	C	In
Existing Residential and Educational Use (Receptors adjacent to the effected road network, namely A56, A57(M), A5103)	Health impacts from construction phase vehicle movements	Additional HDV movement during the construction phase have the potential to result health effects due road vehicle exhaust emissions arising from development construction traffic	C	In

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Proposed Residential and Commercial (Plots C, D and E)	Health impacts from exposure to existing air quality conditions	Introduction of new residents into an AQMA and unacceptable exposure to annual mean and hourly concentrations above the national AQOs. Has potential to result health effects due to existing road vehicle exhaust emissions	O	In
Existing and Proposed Residential and Existing Educational Use (Receptors adjacent to the effected road network, including A56, A57(M), A5103)	Health impacts from operational phase vehicle generation	Impact on existing baseline conditions as a result of road vehicle exhaust emissions generated by the Proposed Development. Additional emissions could result in significant health impacts and new exposure to concentrations above national AQOs.	O	In
Existing and Proposed Residential and Existing Educational Use (Receptors within 20 m of car park ventilation extracts)	Health impacts associated with the venting of basement car park emissions	Location of car park ventilation systems have the potential to result in unacceptable exposure to annual and hourly mean concentrations.	O	In

Climate Change

- 5.65. WSP have assessed the vulnerability of the project to climate change (climate vulnerability assessment) and greenhouse gases to determine the likely significant impacts of climate change on the Proposed Development.
- 5.66. Considering a project's impact on climate is a requirement of the 2014 amendment to the Environmental Impact Assessment (EIA) Directive (2014/52). The Directive has been fully transposed into UK law in the EIA Regulations. The EIA Regulations require:
- *"The EIA must identify, describe and assess...the direct and indirect significant effects of the proposed development on...climate"* (Regulation 5(2)).
 - *"A description of the likely significant effects of the development on the environment resulting from... the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change"*(paragraph 5 of Schedule 4).
- 5.67. The assessment has been split into two sections, to ensure all elements are fully scoped.
- Part One – Climate Change: Green House Gases covers *"the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions)"*.
 - Part Two - Part Two - Climate Change Vulnerability covers *"the vulnerability of the project to climate change"*.

Part One - Introduction to Climate Change: Green House Gases

- 5.68. The requirement to consider a project's Green House Gas (GHG) emissions results from the 2014 amendment to the EIA Directive (2014/52/EU). The Directive has been fully transposed into the UK law in the EIA Regulations. The Directive requires: 'A description of the likely significant effects of the project on climate (for example, the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.'
- 5.69. This chapter of the Scoping Report has been prepared by WSP and assesses the likely Climate Change related impacts of the Proposed Development upon the EIA Site and surrounding area. The chapter describes the methods used to:
- assess potential impacts,
 - establish existing baseline conditions,
 - identify proposed mitigation measures required to prevent,
 - reduce or offset any significant adverse effects and
 - to describe any residual effects, after these mitigation measures have been adopted.

- 5.70. The author of this scoping methodology has M. Plan, Environment degree and has experience in preparing Climate Change Chapter for EIA developments of 3 projects till date.

Assumptions and Limitations

- 5.71. To ensure transparency within the EIA process, the following limitations and assumptions have been identified at this stage:
- Future improvements to vehicle fuel efficiency and electrification will not be considered. As technology continues to develop, this is likely to result in reduced emissions compared to those that will be used in the assessment;
 - For the purposes of this assessment, it will be assumed that the Proposed Development would be operational for 60 years, which is the average lifespan for this type of development;
 - The data required to calculate emissions in the existing and future baseline scenario has not been provided at this Scoping stage and will be required at the ES stage to undertake a detailed assessment;
 - Depending on the available information at the time of the further assessment, there may be some uncertainty regarding the types and quantities of materials to be used in construction; and
 - The assessment will not consider any specific Committed Developments in addition to the Proposed Development because as GHGs are not spatially contained, the assessment already considers the cumulative effect of all GHGs that could contribute to climate change. Therefore, the assessment of the GHG due to the Proposed Development implicitly assesses the cumulative effect of GHG emissions and contextualises these against the UK Carbon Budgets and RIBA 2030 Climate Change targets. For this reason, the ES Chapter will not consider a standalone cumulative scenario.

Legislative and Policy Context

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

Legislation

Climate Change Act 2008 (2050 Target Amendment)⁶

- 5.73. The Climate Change Act 2008 sets targets for reducing the UK's impacts on climate change and the need to prepare for managing the impacts. The Act sets a target of 80% carbon dioxide (CO₂) emissions reduction by 2050 (against a 1990 baseline) and sets interim targets to ensure progress towards this target. The Act also requires a Climate Change Risk Assessment (CCRA) to be used to assess the risks from the impact of climate change to the UK.
- 5.74. The first CCRA in the UK was presented to Parliament in an Evidence Report in 2012, with the second presented in 2017. The overall aim of the Report was to assess the urgency of further action to tackle current and future risks, and realise opportunities, arising for the UK, from climate change.
- 5.75. The Act also requires the production of a national adaptation plan for the UK Government to implement to be ready for the challenges of climate change and a variety of organisations with key responsibilities (i.e., deemed to have adaptation reporting powers, ARP), were required to submit an ARP report of the steps they were and are taking to prepare for climate change.

Planning and Energy Act 2008⁷

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

Carbon Budgets 2021⁸

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

⁶ HM Government, 2008. Climate Change Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/introduction> (Accessed 20/12/2022).

⁷ HM Government, 2008. Planning and Energy Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/21/introduction> (Accessed 20/12/2022).

⁸ ^[1] HM Government, 2021. The Carbon Budgets Order 2021. Available at: <https://www.legislation.gov.uk/uksi/2021/750/contents/made> (Accessed 19/12/2022)

The Carbon Plan: Delivering Our Low Carbon Future⁹¹⁰

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

The Building Regulations Part L1A¹¹

- 5.79. The Building Regulations Part L governs the conservation of fuel and power in both new construction and refurbishment of the England and Wales building stock. Compliance with the Building Regulations is a regulatory requirement for all new developments. Carbon emissions of a development comparative to compliance with Part L is the key performance indicator for achieving many carbon targets. The new Building Regulations which came into effect from 15 June 2022, comprise five new Approved Documents, including uplifts to Part L (fuel and power) and Part F (ventilation), and will have a marked impact on new and existing buildings.

National Planning Policy and Guidance

National Planning Policy: National Planning Policy Framework 2021¹²

- 5.80. The National Planning Policy Framework (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 8, the document confirms that the purpose of the planning system is to contribute to the achievement of sustainable development, which includes economic, social, and environmental dimensions. The main relevant policies are set out in paragraphs 8, 20, 148, 150 and 154 which all support the reduction of greenhouse gas emissions.

Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA) 2022¹³

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

RIBA 2030 Climate Change Targets version 2 (2021)¹⁴

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

Local Planning Policy

Manchester Local Development Framework¹⁵

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

⁹ DECC, 2011. The Carbon Plan: Delivering our Low Carbon Future. Available at: <https://www.ukgbc.org/EIA Sites/default/files/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf> (Accessed 19/12/2022).

¹⁰ HM Government, 2021. The Building Regulations 2010, Approved Document L1A: conservation of fuel and power in dwellings, 2021 edition with 2016 amendments. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1082462/ADL1_revised.pdf (Accessed 19/12/2022)

¹¹ HM Government, 2021. The Building Regulations 2010, Approved Document L1A: conservation of fuel and power in dwellings, 2021 edition with 2016 amendments. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1082462/ADL1_revised.pdf (Accessed 19/12/2022)

¹² Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed 20/12/2022)

¹³ Institute of Environmental Management and Assessment, 2022. Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (Accessed 20/12/2022)

¹⁴ Royal Institute of British Architects (RIBA), 2021. RIBA 2030 Climate Challenge version 2 (2021). Available at: <https://www.architecture.com/about/policy/climate-action/2030-climate-challenge/resources> (Accessed 20/12/2022)

¹⁵ Manchester City Council, The Manchester Local Development Framework. Available at: [General information | About the Local Development Framework \(LDF\) | Manchester City Council](#) (Accessed 20/12/2022)

Manchester City Council Climate Change Action Plan 2020-2025

- 5.84. The Climate Change Action Plan (CCAP) of the MCC has a target to reduce direct emissions of CO₂ by 50% over the five-year period up to 2025. To achieve this, the Council aims to reduce its emissions by 13% every year, for five years. The CCAP sets a carbon budget of 119,917 tonnes of CO₂ for the five-year period of 2020-25, calculated using science-based targets. This action plan also details the activities that will have to be undertaken, developed and investigated further over the next five years in order to ensure the transition to being a zero carbon city by 2038. Although the plan includes investment in green and blue infrastructure to increase carbon storage and sequestration, reaching zero carbon will not include offsetting the emissions. The ambition has been informed by the SCATTER project (Setting City and Area Targets and Trajectories for Emissions Reductions), which is a model that helps cities set zero carbon targets from their buildings, energy and transport.

Table 9 MCC Carbon Budget: Climate Change Action Plan 2020-2025

Carbon budget period	MCCs carbon budget
2020-21	0.031080 MtCO ₂ e
2021-22	0.027056 MtCO ₂ e
2022-23	0.023538 MtCO ₂ e
2023-24	0.020478 MtCO ₂ e
2024-25	0.017815 MtCO ₂ e

Consultation

- 5.85. For the purpose of compiling this report, no consultations have been undertaken. All data has been collected through desk-based studies.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.86. For this technical chapter, Scenario 7 (Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6) will be tested. Please refer to
- 5.87. Table 1019 for further details.

Table 10: Scenario 7 constituents

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

- 5.88. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to the Climate Change discipline and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Climate Change discipline will be testing the development as a whole.

The Study Area

- 5.89. The GHG emissions assessment has not been restricted by geographical area. As per the accepted guidance, it has, instead, been conducted to include any increase or decrease in emissions because of the Proposed Development, wherever that may be. This includes:
- Construction stage embodied carbon emissions (as per stages A1-A5 of PAS 2080)¹⁶ associated with the transport of materials to and from the EIA Site and their manufacture, in addition to the disposal of the building elements during construction.
 - Operational stage embodied carbon emissions (as per stages B1-B9 of PAS 2080) associated with the replacement/refurbishment of building parts, emissions associated with the buildings' energy use, including but not limited to: electricity, heating and lighting. Transport emissions arising from the use of the Proposed Development, as well as the surrounding regional road network to gain access to the EIA Site, would also fall under operational emissions, in addition to any shifts in transport modes/patterns which may result.
 - End of life stage embodied carbon emissions (as per stages C1-C4 of PAS 2080) associated with decommissioning works as well as from transport, processing, and disposal of materials during this phase.

Baseline Surveys and Assessment

- 5.90. Baseline data for the GHG assessment will be derived and modelled using:
- One Click LCA Software - embodied carbon calculation;
 - The Energy Statement (as submitted in support of the planning submission);
 - The Transport Assessment (as submitted in support of the planning submission);
 - Department for Business, Energy & Industrial Strategy, 2005 to 2020 UK local and regional CO2 emissions – data tables, 2020; and
 - Royal Institute of British Architects (RIBA) 2030 Climate Challenge.
- 5.91. The assessment will be prepared on the basis of desk-based studies; no primary surveys or consultations will be carried out for the purpose of this work.
- 5.92. Subject to the agreement of scoped in elements, the assessment of likely significant effects will follow IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance.
- 5.93. For all in scope lifecycle stages of the Proposed Development, the assessment will be completed by:
- Collecting of available data/information on the scale of GHG emitting activities (e.g., consumption of materials, number of vehicle trips, kWh electricity) for the Proposed Development's design life (60 years); and
 - Calculating the associated GHG emissions by applying a suitable emissions factor (tCO2e per unit of emissions generating activity).

Significant Criteria Effects

- 5.94. The methodology adopted in the ES will attribute a significance of effect level based on the sensitivity/value of the affected receptor(s) and the magnitude of change arising from the Proposed Development. As there is only one receptor, 'the climate', the IEMA guidance applied recommends a consistent sensitivity (high) no matter the location of the emissions source.

¹⁶ PAS 2080:2016 – Carbon Management in Infrastructure – the world's first standard for managing infrastructure GHG emissions Available at: <https://knowledge.bsigroup.com/products/carbon-management-in-infrastructure/standard>

5.95. With regards to assigning significance, the 2nd edition of the IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022) provides five distinct levels of significance (outlined in para 16.5.8 of the guidance) which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero. Specifically, when considering the aspect of significance, the IEMA guidance states:

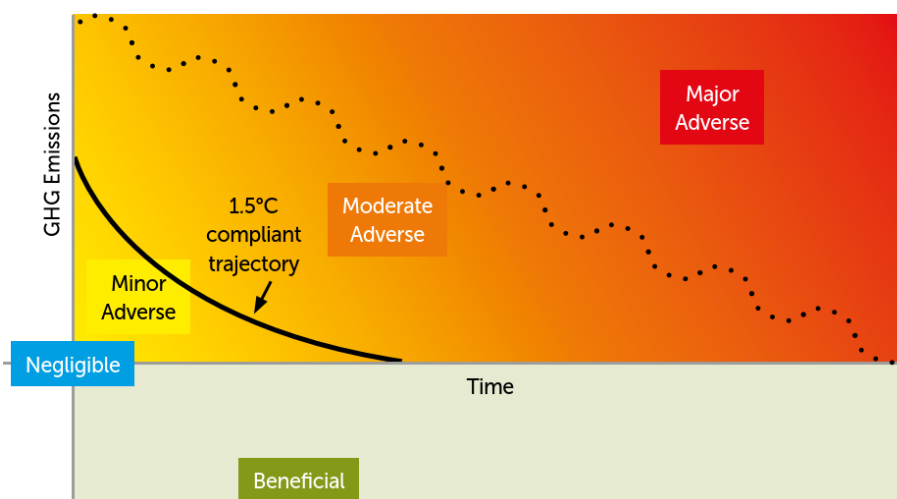
“When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project’s emissions should therefore be based on its net impact over its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

and

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

5.96. Figure 5 illustrates how the significance of a project’s whole life GHG emissions can be determined and how these align with the UK’s net zero compatible trajectory.

Figure 5 Different levels of significance plotted against the UK’s net zero compatible trajectory



5.97. The levels of significance as defined in the IEMA guidance are outlined below:

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

5.98. As per the IEMA guidance: major or moderate adverse effects (as well as beneficial effects) are considered significant; minor adverse and negligible effects are considered to be not significant.

- 5.99. Contextualising the GHG emissions from a Proposed Development helps to determine whether it supports or undermines the UK's trajectory towards net zero. IEMA guidance further suggests that "It is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact".
- 5.100. To contextualise the forecast carbon emissions of the Proposed Development, acquired data will be compared to:
- UK Fourth to Sixth Carbon Budgets, as set out in Table 20
 - Carbon Budgets for MCC, Climate Change Action Plan, Table 21
 - RIBA 2030 Climate Change Targets, in Table 22

Table 11 : UK Carbon Budgets set by the government 2021

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

Table 12: Carbon Budgets for Manchester City, Climate Change Action Plan

Carbon Budget Period	Annual Cap (tCO ₂)
2018 – 2019	41,087 tCO ₂
2019 – 2020	35,745 tCO ₂
2020 – 2021	31,099 tCO ₂
2021 – 2022	27,045 tCO ₂
2022 – 2023	23,538 tCO ₂
2023 – 2024	20,478 tCO ₂
2024 – 2025	17,816 tCO ₂

Table 13: RIBA 2030 climate change targets - version 2 (2021)

RIBA sustainable outcome metrics	Business as usual (New build, compliance approach)	2025 Targets	2030 Targets
Domestic			
Operational Energy kWh/m ² /y	120 kWh/m ² /y	<60 kWh/m ² /y	<35 kWh/m ² /y
Embodied Carbon kgCO ₂ e/m ²	1,200 kgCO ₂ e/m ²	<800 kgCO ₂ e/m ²	<625 kgCO ₂ e/m ²
Non-Domestic (new build offices)			
Operational Energy kWh/m ² /y	130 kWh/m ² /y DEC D (90)	<75 kWh/m ² /y (DEC B (50) and/or NABERS Base build 5)	<55 kWh/m ² /y (DEC B (40) and/or NABERS Base build 6)
Embodied Carbon kgCO ₂ e/m ²	1,400 kgCO ₂ e/m ²	<970 kgCO ₂ e/m ²	<750 kgCO ₂ e/m ²

RIBA sustainable outcome metrics	Business as usual (New build, compliance approach)	2025 Targets	2030 Targets
Non-Domestic (New build schools)			
Operational Energy kWh/m2/y	130 kWh/m2/y	<70 kWh/m2/y	<60 kWh/m2/y
Embodied Carbon kgCO ₂ e/m2	1,000 kgCO ₂ e/m2	<675 kgCO ₂ e/m2	<540 kgCO ₂ e/m2

- 5.101. Based on this contextualisation and professional judgement, the overall significance of effect of the Proposed Development will be defined (based on RIBA targets as per Table 22) as follows:
- Major magnitude of impact: where the Proposed Development is within (i.e. does not exceed) the “Business as Usual” threshold for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance.
 - Moderate magnitude of impact: where the Proposed Development is between the “Business as Usual” and the “2025 Targets” for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance.
 - Minor magnitude of impact: where the Proposed Development is between the “2025 Targets” and the “2030 Targets” for the embodied carbon and operational energy performance, respectively, defined by the RIBA guidance; and
 - Negligible magnitude of impact: where the Proposed Development exceeds the “2030 Targets” for the embodied carbon and operational energy performance respectively defined by the RIBA guidance.

Source of Effect

- 5.102. In accordance with guidance from the Institute of Environmental Management and Assessment (IEMA) [13], the emissions sources for the Proposed Development (also described as ‘elements’), alongside their associated Lifecycle Stage as derived from Publicly Available Specification (PAS 2080), have been identified in Table 23Table 14.

Table 14: Key Emission Sources during the lifespan of the Proposed Development

Lifecycle Stage (As per PAS 2080)	Element	Likely Source of emission
Construction Phase	Product stage (manufacture and transport of raw materials to suppliers) (A1-3)	Embodied emissions associated with extraction and manufacturing of the required raw materials.
	Transport of materials to EIA Site (A4)	Emissions from fuel and electricity used in vehicles transporting materials to EIA Site.
	Plant and equipment used during construction (A5)	Emissions from fuels and electricity used in plant and equipment on EIA Site.
	Transport of waste (A5)	Emissions from fuel/energy used in vehicles transporting materials away from EIA Site.
	Disposal of waste (A5)	Emissions from the final disposal of waste materials.
	Land use, land use change and forestry (A5)	Change in emissions associated with the clearance and disposal of biomass due to the Proposed Development.
Operational Phase	Operation (B1)	Embodied emissions, and emissions associated with electricity use for lighting.
	Maintenance (B2)	Embodied emissions, and emissions from transport and plant associated with maintenance.

Lifecycle Stage (As per PAS 2080)	Element	Likely Source of emission
	Repair (B3)	Embodied emissions, and emissions from transport and plant associated with repair.
	Replacement (B4)	Embodied emissions and emissions from transport and plant associated with replacement.
	Refurbishment (B5)	Embodied emissions and emissions from transport and plant associated with refurbishment.
	Operational Energy Use (B6)	Emissions resulting from the energy used, e.g., heating and cooling, ventilation, lighting, and the combustion of gas.
	Operational Water Use (B7)	Emissions from the use of water required by infrastructure to enable it to operate and deliver its service.
	Land use, land use change and forestry (B8)	Change in emissions associated with the existence of the Proposed Development hindering or promoting the sequestration of CO ₂ into biomass.
	Effect on the grid mix (B9/D)	The change in emissions due to the impact of the Proposed Development hindering or promoting the sequestration of CO ₂ into biomass.
End of life	Decommissioning process (C1)	Emissions from decommissioning work (i.e., fuel/electricity).
	Transport and disposal of materials (C2-C4)	Emissions sources as fuel/energy consumption from the transport of materials to disposal EIA Sites or recovery.

Baseline Conditions

- 5.103. Existing baseline: In the 'Do minimum' baseline scenario, GHG emissions are released constantly and widely as a result of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change. In accordance with the process set down in the Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA) [13] 2022, any future GHG assessment considers only where the Proposed Development results in additional or avoided emissions by comparison with the existing baseline and its forecast evolution.
- 5.104. The Proposed Development is set out in Table 23. The future baseline includes emissions from the construction and operation of the Proposed Development. The future baseline scenario for traffic emissions will be determined by using the projected traffic data with respect to changes in mode share, trip numbers and distance covered.
- 5.105. In relation to operational emissions for embodied carbon and building emissions, the quantity of coal in the UK electricity mix has decreased substantially in recent years, with low and zero carbon technologies (photovoltaic, wind and nuclear energy, for example) being increasingly used to generate a larger portion of the UK's electricity. This has resulted in a reduction of carbon emissions generated from grid-supplied electricity. As the grid decarbonises, reduced emissions through the use of renewable on-EIA Site electricity will also result in a lower carbon lifetime impact.
- 5.106. Finally, it is noteworthy that as the UK has committed to becoming net-zero carbon by 2050, GHG emissions would not only need to be dramatically reduced, but remaining emissions offset. Responding to this, the UK Government has recently announced that the Future Homes standard will necessitate that no new gas boilers are installed in new homes by 2025.

Potentially Significant Effects

- 5.107. In this section of the chapter, professional judgement has been used to identify the emission sources in the construction (C), operation (O) and end of life (EOL) phases, which should be scoped in or out from further consideration in the ES.
- 5.108. In line with the emission sources identified in, the elements scoped in or out of further assessment are detailed in Table 24.

Table 15: Elements Scoped in or out for further consideration in the GHG Assessment

Receptor	Element	Description of Potential Effect	Applicable Development Phase (C/ O/ EOL)	Scoped In / Out
Global Climate	Product stage (manufacture and transport of raw materials to suppliers) A1-A3	Raw materials required for the Proposed Development will result in embodied emissions and have the potential to be significant.	C	In
	Transport of materials to EIA Site A4	Construction stage emissions from fuel / energy consumption due to the delivery of material to EIA Site have the potential to be significant.	C	In
	Plant and equipment use during construction A5	Fuel / energy consumption of plant and equipment used during construction would generate GHG emissions.	C	In
	Land use, land use change and forestry A5	Emissions from the disposal of biomass are not expected to be significant.	C	Out
	Disposal of waste A5	Emissions from the disposal of waste are unlikely to be significant, due to a large proportion of construction waste being inert.	C	Out
	Replacement and refurbishment B2-B5	The replacement and refurbishment of the Proposed Development would release a potentially significant magnitude of emissions	O	In
	Operational Energy Use B6	Emissions will be released from the heating, cooling, ventilation, domestic hot water, lighting, and auxiliary systems for constructed buildings.	O	In
	Operational Water use B7	Emissions due to water usage during the operation phase are unlikely to be significant.	O	Out
	End-user emissions (regional traffic flows) – traffic B9/D	Changes to regional traffic flows are expected and this has the potential to result in a significant adverse effect on GHG emissions.	O	In
	In-use Emissions B1	This is not considered to be a significant emission source.	O	Out
	Maintenance B2-B5	Maintenance associated with the Proposed Development is not considered to be a significant emissions source as only a small amount will be additional to the maintenance that already takes place within the region.	O	Out

Receptor	Element	Description of Potential Effect	Applicable Development Phase (C/ O/ EOL)	Scoped In / Out
	Repair B2-B5	The Proposed Development is designed to be maintained rather than repaired, therefore subsequent repair emissions sources are not considered to be material to the assessment.	O	Out
	Land use, land use change and forestry B8	The reduction in carbon sequestration due to the Proposed Development is not considered to be significant as land use, land use change and forestry will not be in scope due to the type and scale of the Proposed Development.	O	Out
	Decommissioning process C1-C4	Since there is no certainty of information on the extent of, or processes for, decommissioning Proposed Development assets at their end of life, it is not possible to accurately assess the associated emission impacts of this phase. It is recommended that the C1-C4 stage is, therefore, scoped out.	EOL	Out

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

Part Two - Introduction: Climate Change Vulnerability

- 5.109. This section has been prepared by WSP and assesses the vulnerability of the project to climate change (climate vulnerability assessment) and likely significant impacts of climate change on the Proposed Development.
- 5.110. The author of this input has I have a BSc in Geography and three years' experience in authoring EIA chapter for climate and undertaking climate vulnerability risk assessments.

Assumptions and Limitations

- 5.111. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- 5.112. There is currently no agreed industry methodology that should be applied for assessing the vulnerability under the EIA Regulations. Therefore, an approach has been developed and applied in this assessment based on existing best practice and our extensive project experience.
- 5.113. The UKCP18 projections have been used to infer future changes in a range of climate variables that may affect the vulnerability of the Proposed Development to climate change. At the time of writing, these represent the most up-to-date representation of future climate in the UK.
- 5.114. The Climate Risk Indicators, developed as part of the UK Climate Resilience Programme, have been used to infer this assessment. As such there are inherited limitations and uncertainties within the data. Further information on the methodology used to produce this data can be found in Arnell, et al., (2021)¹⁷.
- 5.115. There are inherent uncertainties associated with climate projections and they are not predictions of the future. It is possible that future climate will differ from the future baseline climate against which the resilience of the Proposed Development has been assessed, depending on global emissions over the next century. A 'high' emissions scenario (RCP 8.5) using the 2080s time slice (2070–2099, the longest temporal scale available through UKCP18) has been used to develop the baseline against which resilience has been assessed. This is consistent with the precautionary principle (i.e., 'worst case' scenario).

¹⁷ Arnell, et al., (2021) Changing climate risk in the UK: a multi-sectoral analysis using policy-relevant indicators. Climate Risk Management 31, 100265 10.1016/j.crm.2020.100265. Available at <https://www.sciencedirect.com/science/article/pii/S2212096320300553>

- 5.116. Any further research, analysis or decision-making should take account of the accuracies and uncertainties associated with climate projections. It is also important to note that the analysis is based on selected observational data, the results of climate model ensembles and a selected range of existing climate change research and literature available at the time of assessment. Any future decision-making based on this analysis should consider the range of literature, evidence and research available at that time and any changes to this.
- 5.117. The climate vulnerability assessment has utilised information that will be incorporated into the Proposed Development design when undertaking the vulnerability assessment, These design measures have been listed in the assessment as embedded mitigation.

Consultation

- 5.118. No consultation in relation to climate vulnerability has been undertaken to date.

Assessment Methodology

The Study Area

- 5.119. The scope for the climate vulnerability assessment relates to the impact of climate change on the Proposed Development (rather than the impact of the Proposed Development on climate). As such, the Study Area is defined as the Red Line Boundary.

Baseline Assessment Methodology

- 5.120. The Institute of Environmental Management and Assessment (IEMA) EIA Guide to Climate Change Resilience and Adaptation¹⁸ (June 2020) identifies the need for the baseline to consider:
- The current climate baseline (defined by historic climate conditions published by the Met Office) to provide an indication of past vulnerability; and
 - The future climate baseline (short-term extremes and long-term variation) to assess a project's future vulnerability to climate change taken from UKCP1819 and the Climate Risk Indicator Tool²⁰.

Climate Vulnerability Assessment

- 5.121. The scope of the assessment includes the construction period and design life of the Proposed Development's key components as follows:
- Construction (anticipated that is to be completed either by 2030 or 2034), consisting of:
 - The construction EIA Site (including access road and temporary buildings such as offices);
 - Workers;
 - Materials; and
 - Plant and equipment (including fencing, drainage and lighting).
 - Operation period (approx. 60 years), consisting of:
 - Buildings (residential and office space);
 - Public Realm which includes pedestrianised areas and car parking and vegetation; and
 - End users of the Proposed Development.
- 5.122. The IEMA guidance and Design Manual for Roads and Bridges (DMRB) LA 114²¹ have been used to infer this assessment.
- The IEMA EIA Guide to: Climate Change Resilience and Adaptation outlines that the scoping stage should identify the key climatic variables relevant to the project in question and the likely effects; however, it is not prescriptive in how this should be undertaken.
 - The DMRB LA 114 outlines that scoping ought to focus on the identification of any likely significant climate changes and likely project exposure to these changes to identify vulnerable elements of a project that require further assessment.

¹⁸ IEMA (2021) IEMA EIA Guide to Climate Resilience and Adaptation

¹⁹ Met Office (2019) UK Climate Projections. Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index>. [Accessed 07/08/22].

²⁰ Nigel Arnell (2021) The Climate Risk Indicators. Available at: <https://uk-cri.org/> [Accessed 07/08/22].

²¹ Standards for Highways. (2021). DMRB LA 114. Available at: <https://www.standardsforhighways.co.uk/dmrbs/search/d1ec82f3-834b-4d5f-89c6-d7d7d299dce0>

- 5.123. In order to identify the vulnerable elements, a sensitivity and exposure assessment has been undertaken.
- 5.124. The 'vulnerability' to climate change is the degree to which the Proposed Development and its receptors, including users, is susceptible to, and unable to cope with, the adverse effects of climate change. Vulnerability is a function of:
- 'Sensitivity': the degree to which the Proposed Development and its receptors may be affected (adversely or beneficially) when exposed to climate variability or the change in the resulting geophysical (e.g., flooding) hazards. Mitigation measures incorporated into the Proposed Development have been considered when assessing sensitivity. In this assessment, sensitivity is based on literature review and expert judgement and rated as high, medium or low; and
 - 'Exposure': the nature and degree to which the Proposed Development and its receptors are exposed to significant variations in climate variables and hazards. In this assessment, exposure is based on the baseline information presented above and rated as high, medium or low.
- 5.125. The vulnerability of receptors to climate variables is determined from the combination of the sensitivity and exposure ratings, using the matrix shown in Table 25. At this point, climate variables in the construction and operation phase to which the Proposed Development is likely to have a Low vulnerability to are scoped out of further assessment. Climate variables in the construction and operation phase to which the Project is likely to have a medium or high vulnerability to are taken forward for further assessment at the next stage.
- 5.126. This is a qualitative assessment informed by expert opinion and supporting literature. Table 25 describes the vulnerability assessment using sensitivity and exposure.

Table 16 Vulnerability Matrix

SENSITIVITY	EXPOSURE		
	Low	Medium	High
Low	Low vulnerability	Low vulnerability	Low vulnerability
Moderate	Low vulnerability	Medium vulnerability	Medium vulnerability
High	Low vulnerability	Medium vulnerability	High vulnerability

Baseline Assessment

Current Baseline

- 5.127. The Proposed Development is located in the Met Office climate profile North West England²². The range of topography and altitude in North West England provides a variety of different climates. Woodford is the nearest weather station and therefore has been chosen as representative of the local climate. This has been assessed under the baseline period of 1981-2010 as this is the 30-year period that corresponds to the future climate projections.

Rainfall

- 5.128. North West England is exposed to westerly maritime air masses and the presence of extensive areas of high ground mean that the region has some of the wettest places in the UK.
- 5.129. Average monthly rainfall at Woodford Weather station, England North West and Wales North region (as defined by the Met Office regional weather), and the UK for the period 1981–2010 is presented in Table 26. It shows that the weather station is wetter than the region and the UK for both summer and winter.

Table 17 Long term average cumulative rainfall (mm) (1981–2010) for the North West England region and Wales North region and Woodford Weather Station, in comparison to the rest of the UK

Long Term Average Seasonal Rainfall (1981-2010s) (mm)			
Season	Woodford Weather Station	England North West and Wales North region	UK
Summer (June, July, August)	211 mm	92 mm	79 mm

²² Met Office (2016) North West England: Climate. Available at: (<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/north-west-england--isle-of-man--climate---met-office.pdf>) [Accessed 07/08/22].

Winter (January, February, December)	223 mm	125 mm	110 mm
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5.130. Some notable extreme rainfall events for the region include:

- February 2022: Following Storm Eunice, heavy rainfall continued to affect North West England. The Met Office issued a yellow weather alert for the 20th and the 21st of February, warning of heavy rain²³. Homes, businesses and travel routes across the country were flooded as a result²⁴.
- October 2021: A slow-moving frontal system brought unusually heavy and persistent rain to parts of northern England and southern Scotland from 26th to 29th October 2021²⁵.
- July 2021: Urgent flood warnings were issued as torrential rainfall swept across Northern England. Heavy rain led to chaos across Greater Manchester, resulting in road closures across the network²⁶.

Snow and ice

5.131. Snowfall is closely linked with temperature, with falls rarely occurring if the temperature is higher than 4°C. In North West England, snowfall is normally confined to the months from November to April, but upland areas can have brief falls in October and May. The region most recently experienced a snow event in:

- February 2021: The UK experienced a week of severe winter weather from 7th to 13th February, with easterly winds drawing a bitterly cold airflow from eastern Europe²⁷. Resulting in widespread travel disruption. An amber weather warning for snow came into force for Greater Manchester, with 3cm-8cm snow across North West England, with 10cm to 15cm possible in areas above 200 metres²⁸.
- February to March 2018: The most significant spell of snow and low temperatures for the UK overall since December 2010. The snow and ice resulted in road closures, people becoming stranded, school closures, and power cuts²⁹. The spell also led to many instances of broken heating or frozen pipes, which led to buildings flooding.³⁰

Temperature

5.132. Table 27 shows the long-term average mean seasonal temperature for England North West and Wales North region and Woodford Weather Station between 1981 and 2010. It shows that the EIA Site is slightly warmer than the region and UK average.

Table 18 Long-term average mean seasonal temperature for the England North West and Wales North region and Rochdale Weather Station, in comparison to the rest of the UK

Long Term Average Seasonal Temperature (1981-2010s) (°C)			
Season	Woodford Weather Station	England North West and Wales North region	UK
Summer (June, July, August)	16 °C	14.4 °C	14.4 °C

²³ Rochdale online (19th Feb 2022) Heavy rain after storm Eunice. Available at: [Rochdale News | News Headlines | Heavy rain after Storm Eunice - Rochdale Online](#). [Accessed 07/08/22].

²⁴ The Guardian (2022) Storm Franklin Flooding and Property Damage – in pictures. Available at: <https://www.theguardian.com/uk-news/gallery/2022/feb/21/storm-franklin-flooding-and-property-damage-in-pictures-uk-weather>. [Accessed 07/08/22].

²⁵ Met office (2021) Heavy and persistent rain, October 2021. Available at: [Microsoft Word - 2021_06_october_rain.docx \(metoffice.gov.uk\)](#). [Accessed 07/08/22].

²⁶ Manchester Evening News (2021) Heavy rain causes flooding on roads and motorways across Greater Manchester. Available at: [Heavy rain causes flooding on roads and motorways across Greater Manchester - Manchester Evening News](#). [Accessed 07/08/22].

²⁷ Met Office, Press Office (Feb 2021) Snow moving in for many – February 2021. Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2018/snow-and-low-temperatures-february-to-march-2018---met-office.pdf>.

²⁸ ITV (2021) Travel disruption as heavy snow hits parts of northern England. Available at: [Travel disruption as heavy snow hits parts of northern England | ITV News](#). [Accessed 07/08/22].

²⁹ Met Office (2018) Snow and low temperatures February to March 2018. Available at: [snow-and-low-temperatures-february-to-march-2018---met-office.pdf \(metoffice.gov.uk\)](#). [Accessed 07/08/22].

³⁰ The Independent (2018) Storm Emma as it happened. Available at: https://www.independent.co.uk/news/uk/home-news/uk-weather-live-updates-storm-emma-snow-ice-forecast-flights-airports-roads-traffic-freezing-met-office-a8236006.html?page=3&jw_start=%7Bseek_to_second_number%7D [Accessed 07/08/22].

Winter (January, February, December)	5 °C	3.85 °C	3.7 °C
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5.133. For 1981-2010, the average maximum temperature for the summer months was 19.6 °C and the average minimum temperature for winters was 0.79 °C. Some noteworthy extreme temperature events were:

- July 2022: The UK experienced a brief but unprecedented extreme heatwave from 16 to 19 July 2022, as hot air moved north from the near continent, with extreme temperatures recorded on both 18th and 19th. This heatwave marked a milestone in UK climate history, with 40°C being recorded for the first time in the UK, with a large part of England exceeding 37°C³¹.
- March to April 2021: The UK experienced a brief spell of unusual warmth at the end of March with temperatures across England and Wales widely reaching 20 to 22°C. Many long-running stations recorded their warmest March day on record. The warmth of late March was followed by a cold plunge in early April as a brisk northerly airstream brought a cold Arctic Maritime airmass across the UK, accompanied by wintry showers.
- Summer 2018: The weather was warm, dry, and sunny with the UK under the influence of high pressure, particularly during June and July. This was the UK's warmest summer since 2006, the driest since 2003 and the sunniest since 1995³².

Humidity

5.134. The relative annual average humidity for Woodford weather station is 76 to 78% and slightly higher in the surrounding areas (78 to 80%)³³.

Wind

5.135. North West England is amongst the more exposed parts of the UK, being relatively close to the Atlantic and containing large upland areas. The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in winter, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are strongest.

5.136. Some noteworthy wind events include:

- February 2022: The most recent notable gale affecting the region was in February 2022, Storm Eunice. Wind speeds reached around 50mph in the area of the proposed EIA Site, with transport disrupted due to fallen lorries and trees³⁴. Fallen trees also damaged buildings, and the storm caused damage to roofs on buildings such as homes, churches and the O2 arena in London³⁵.
- December 2021: Storm Barra brought strong winds and heavy rain across the UK from 7 to 8 December 2021³⁶.
- November 2021: Storm Arwen brought severe winds across the UK overnight for the 26 to 17 November, with the Met Office issuing a red weather warning³⁷. The storm brought high winds and chaos on roads and motorways, with tree falls and house toppling being reported³⁸.

Sea level

5.137. The Proposed Development is located approximately 34 miles east from the Irish Sea. As the Proposed Development is at a considerable distance from the major UK water bodies, variables associated with sea level and sea temperature are not considered relevant and have been scoped out of this assessment.

³¹ Met Office (2022) Unprecedented extreme heatwave, July 2022. Available at:

https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2022/2022_03_july_heatwave.pdf [Accessed 07/08/22].

³² Met Office (2020) Summer 2018. Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2018/summer-2018---met-office.pdf>. [Accessed 07/08/22].

³³ Met Office (2020) UK climate averages, Average maps. Available at <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcjujye83> [Accessed 07/08/22].

³⁴ Met Office (2022) Storms Dudley, Eunice and Franklin, February 2022. Available at: [Microsoft Word - 2022_02_storms_dudley_eunice_franklin.docx \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2022/2022_02_storms_dudley_eunice_franklin.docx) [Accessed 07/08/22].

³⁵ ITV News (2022) Storm Eunice 2022: The impact of the worst winds in 30 years. Available at: <https://www.itv.com/news/2022-02-17/storm-eunice-tracker-when-will-it-hit-my-region>

³⁶ Met Office (2021) Storm Barra, 7-8 December 2021. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2021/2021_08_storm_barra.pdf [Accessed 07/08/22].

³⁷ Met Office (2021) Storm Arwen, 26 to 27 November 2021. Available at: [Microsoft Word - 2021_11_storm_arwen.docx \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2021/2021_11_storm_arwen.docx) [Accessed 07/08/22].

³⁸ Manchester Evening news (2021) Storm Arwen hits Greater Manchester covering back gardens, roads and beauty spots in snow. Available at: [Storm Arwen hits Greater Manchester covering back gardens, roads and beauty spots in snow - Manchester Evening News](https://www.manchestereveningnews.co.uk/news/2021-11-27/storm-arwen-hits-greater-manchester-covering-back-gardens-roads-and-beauty-spots-in-snow) [Accessed 07/08/22].

Future Baseline

- 5.138. The UKCP1839 provide data on projected change in climate variables for the UK. Probabilistic projections for the 25km grid square where the Proposed Development is located have been used. A recently developed tool of the Climate Risk Indicators⁴⁰ by Nigel Arnell et al., has been used to infer this assessment. This tool allows for a range of climate related indicators (including but not limited to, Met Office Heatwaves and heat stress) developed using UKCP18, to be assessed.
- 5.139. The UKCP18 are the most up-to-date projections of climate change for the UK, providing projections until the end of the twenty-first century. UKCP18 includes probabilistic projections of a range of climate variables for different emissions scenarios, termed representative concentration pathways (RCPs) and for a range of time slices to the end of the century. The central (50th percentile) alongside the lower (10th percentile) and upper (90th percentiles) estimate projections are presented against baseline levels of 1981-2010s (based on model data). To address the full range of climate model uncertainty the results are provided as 50th (10th to 90th) percentiles.
- 5.140. RCP8.5 is a high emissions' scenario which combines assumptions about high population and relatively slow income growth with modest rates of technological change and energy intensity improvements.
- 5.141. The future baseline has been presented for the 2030s (2020-2049), the 2050s (2040-2069) and 2080s (2070-2099) to identify the anticipated climate conditions over the construction period and design life of the Proposed Development's key components (refer to the scope of assessment below).

Rainfall

- 5.142. Climate change is projected to lead to wetter winters and drier summers although natural variation, including extreme events such as storms, heavy downpours and heatwaves, will continue to punctuate these trends. The projected changes to average summer and winter rainfall for the 2030s, 2050s and 2080s are summarised in Table 28.

Table 19 Projected change in mean summer and winter precipitation (%) for the 2030s, 2050s and 2080s, RCP8.5. The results are shown as 50th (10th-90th)

Season	2030s	2050s	2080s
Summer (June, July, August)	-9.8 (-24.2 to +5.7)	-19 (-36.8 to +1.3)	-29.4 (-48.7 to -6)
Winter (January, February, December)	+2.2 (-4.5 to +9)	+6.7 (-1.8 to +15.5)	+12.7 (+0.6 to +26.12)

Snow and ice

- 5.143. With regards to future changes, rising winter temperatures are likely to reduce the amount of precipitation that falls as snow in winter. Snowfall data is unavailable for the probabilistic projections (25km), however both the regional (12km) and the local (2.2km) show a decrease in both falling and lying snow across the UK for the period of 2061-2080 relative to the 1981-2000 baseline⁴¹.

Temperature

- 5.144. In general, UKCP18 predicts that climate change is projected to lead to hotter summers and warmer winters. Table 2029 summarises the UKCP18 projections for changes in mean temperature for the location in the 2030s, 2050s and 2080s under RCP 8.5. For example, an increase in +1.2 degrees summer temperatures in the 2030s at Woodford Weather Station would equate to an average Summer temperature increase from 15 degrees to 16.2 degrees. This would equate to an average summer temperature increase from 15 degrees to 19.4 degrees in the 2080s.

Table 20 Projected change in mean summer and winter temperature (°C) for the 2030s, 2050s and 2080s RCP8.5

Season	2030s	2050s	2080s
Summer (June, July, August)	+1.2 (+0.5 to +1.9)	+2.2 (+0.9 to +3.5)	+4.4 (+2 to +6.8)
Winter (January, February, December)	+0.9 (+0.1 to +1.8)	+1.6 (+0.6 to +2.8)	+3.0 (+1.3 to +4.9)

³⁹ Met Office (2019) UK Climate Projections. Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index>. [Accessed 07/08/22].

⁴⁰ Nigel Arnell (2021) The Climate Risk Indicators. Available at: <https://uk-cri.org/> [Accessed 07/08/22].

⁴¹ Met Office (2019) UKCP18 Factsheet: Snow. Available at: [ukcp18-factsheet-snow.pdf \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/factsheet/snow) [Accessed 07/08/22].

- 5.145. A heatwave is an extended period of hot weather relative to the expected conditions of the area at that time of year. A UK heatwave is defined as the maximum temperature above a region-specific threshold for at least three days. The present-day heatwave threshold for area of the Proposed Development is 25°C⁴². The intensity, frequency and duration of heatwaves are projected to increase under future warming. The projected number of present-day heatwave events per year for the Proposed Development is 1.7 (1.3 to 2.4) in the 2030s, 2.6 (1.5 to 4.3) in the 2050s and 4.6 (2.5 to 6) in the 2080s. Long periods of hot weather can pose threats to both people and infrastructure. The public realm space is made up of pedestrianised areas and a car park which can overheat and melt during heatwave events. In the UK, road melt occurs where temperatures exceed 25°C. The risk of road melt in days per year for the area of the Proposed Development is 14.3 (10.7 to 19.6) in the 2030s, 21.3 (12.5 to 37) in the 2050s and 45.9 (20.5 to 76.9) in the 2080s.
- 5.146. Hot weather can lead to serious health consequences such as heat stress. Heat stress is defined as the amount of evaporation (or perspiration) required as related to the maximum ability of the average person to perspire (or evaporate fluids from the body in order to cool themselves). As temperatures are projected to increase, the risk of heat stress in outdoor workplaces are projected to increase⁴³. In this case, wet bulb global temperature (combining temperature and humidity) exceeding threshold of 25°C is used as a proxy for heat stress⁴⁴. For the area of the Proposed Development, the projected heat stress in days per year are 0.2 (0.1 to 0.3) in the 2030s, 0.5 (0.1 to 2) in the 2050s and 3.7 (0.5 to 11.7) in the 2080s.

Humidity

- 5.147. Projections for humidity anticipate an average decrease of approximately 2.8% (-4.5% to -1.5%) in the 2030s, and a decrease of 5.4% in the 2060s (-7.5% to -3.8%).

Wind

- 5.148. UKCP18 depicts a wide spread of future changes in mean surface wind speed, however, there is large uncertainty in projected changes in circulation over the UK and natural climate variability contributes much of this uncertainty⁴⁵. It is therefore difficult to represent regional extreme winds and gusts within regional climate models⁴⁶.
- 5.149. Central estimates of change in mean wind speed for the 2050s are small in all ensembles runs (<0.2ms⁻¹). A wind speed of 0.2ms⁻¹ (approximately 0.4 knots) is small compared with the typical magnitude of summer mean wind speed of about 3.6–5.1ms⁻¹ (7 – 10 knots) over much of England⁴⁷. Seasonal changes at individual locations across the UK lie within the range of –15% to +10%.
- 5.150. A storm is defined by the Met Office as a wind event measuring 10 or higher on the Beaufort scale (equivalent to a wind speed of 24.5m/s or 55mph). Studies⁴⁸ relating to future projections of storms suggest that climate driven storm changes are less distinct in the northern than southern hemisphere. However, such is the wide range of inter-model variation, robust projections of changes in storm track are not yet possible and there is low confidence in the direction of future changes in the frequency, duration or intensity of storms affecting the UK.

Sea level

- 5.151. Sea level rise has been scoped out of the assessment due to the distance of the Proposed Development from the coast.

Potentially Significant Effects

Embedded mitigation measures

- 5.152. The assessment of climate vulnerability (and therefore significance of potential impacts) will take embedded mitigation into account as an assumed part of the design. The embedded mitigation measures listed in Table 2130**Error! Reference source not found.** have been identified as part of the Proposed Development.

⁴² Met Office (2021) What is a heatwave, Available at: <https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/temperature/heatwave> [Accessed: 29/07/22]

⁴³ Nassiri, P., Monazzam, M. R., Golbabaie, F., Farhang Dehghan, S., Shamsipour, A., Ghanadzadeh, M. J., & Asghari, M. (2020). Modeling heat stress changes based on wet-bulb globe temperature in respect to global warming. *Journal of environmental health science & engineering*, 18(2), 441–450. Available at: <https://doi.org/10.1007/s40201-020-00472-1> [Accessed 28/06/2022]

⁴⁴ Arnell, N. W., Freeman, A., Kay, A. L., Rudd, A. C., & Lowe, J. A. (2021). Indicators of climate risk in the UK at different levels of warming. *Environmental Research Communications*, 3(9), 095005

⁴⁵ Brown, S., Boorman, P., McDonald, R., and Murphy, J. (2012) Interpretation for use of surface wind speed projections from the 11-member Met Office Regional Climate Model ensemble. Post-launch technical documentation for UKCP09. Met Office Hadley Centre, Exeter, UK. Crown copyright.

⁴⁶ Bengtsson, L., K. Hodges, and E. Roeckner, 2006: Storm tracks and climate change. *Journal of Climate*, 19, 3518–3543.

⁴⁷ Jenkins, G.J., Perry, M.C., and Prior, M.J. (2008). The climate of the United Kingdom and recent trends. Met Office Hadley Centre, Exeter, UK.

⁴⁸ Belcher, S., Slingo, J., Scaife, A., McCarthy, M., Saulter, A., McBeath, K., . . . Parry, S. (2014). The recent storms and floods in the UK. *Met Office*, 29

Table 21 - Embedded mitigation measures for climate resilience of the Proposed Development

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
Construction EIA Site / workers	Precipitation	Overwhelmed drainage, waterlogging of materials, disruption to EIA Site access causing programme delays, loss of materials and access/egress issues.	Measures to manage construction phase impacts include: • Early survey of localised drainage and jetting / clearing or repair of same to maximise capacity. • Early connection into permanent drainage system and connection of gulley's / rain water pipes at earliest opportunity. • Temporary waterproofing of levels every 5 floors to protect vulnerable materials, water collected at these floors goes down the SVP's to permanent drain system. • No materials which can be damaged by water are stored at the bottom basement levels. • No plant or electrical equipment is stored at bottom basement levels. • Temporary construction sumps are formed in the bottom basement slab to enable a pumping system to be set up, this is essential as continuous water migrates to the basement via tower crane and hoist openings. • Protect gulley's adjacent to EIA Site with filters to stop silt from concrete washout etc. entering drains and blocking same. • Concrete roads / walkways and temporary drain strategy is formulated to ensure access to EIA Site is not disrupted by localised flooding / ponding.	Construction management plan.
	Temperature	Increased dust generation causing nuisance to the local community.	Best practice guidance (such as pollution prevention guidelines) in respect to dust and water pollution will be followed. Dust suppression measures will be in place as part of the construction management plan.	Construction management plan.
		Heat stress to construction workers during extreme temperatures, such as heatwaves.	Welfare facilities will be provided for construction workers to provide adequate shading and cooling against excessive heat.	Construction management plan.
		Management of materials during extreme heatwave events	Materials stored either in basement or in designated storage units to prevent melting or deformation.	Construction management plan.

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
	Wind	Programme delays and welfare and safety concerns from working in high winds, particularly when working at height, or using cranes.	Pedestrian-level wind study using Computational Fluid Dynamics (CFD). The CFD wind microclimate study considers the phasing of each development in sequence but does not specifically model the construction stage. The study uses the Lawson LDDC criteria, which is a de-facto standard in the UK for assessing pedestrian wind safety and comfort. The analysis uses 20 years of wind data from Manchester airport, transposed to the EIA Site.	Wind modelling, microclimate study and design specification.
		Safety risks when working at height, or use of cranes during storms or high winds	The Main contractor will assess working conditions during high winds / storms to manage risks associated with working at height, use of cranes.	Construction management plan.
Buildings	Precipitation	Flooding and overwhelming of drainage resulting in damage to infrastructure.	Within the design of the drainage network, an allowance for climate change has been included at 45%. This allowance has been used in the determination of the requirement for attenuation within the surface water network. Attenuation is provided in the form of sealed tanks within the basement and impermeable area of 30% voids below the areas of public realm, above the basement slab. A drainage maintenance strategy is provided within the flood risk assessment (FRA). The Maintenance Strategy details the minimum requirements for permeable paving and attenuation tanks which form most of the drainage network. The Proposed Development lies in Flood Risk Zone 1. Probability of flooding is low, with a 1 in 1,000 annual probability of river flooding. The Strategic Flood Risk Assessment Hydraulic Interactions map indicates that the EIA Site will not be affected by flooding from the Bridgewater canal. The Environment Agency's Reservoir Flood map demonstrates that the EIA Site is not within an area that could be affected by flooding from reservoirs in the event of a reservoir failure. The Environment Agency's Map of long-term flood risk from surface water, indicates that most of the EIA Site is at 'Very Low' risk of flooding. Post development surface water run-off rates will be managed and mitigated through the implementation of SUDs.	The requirement for, determination and inclusion of climate change is detailed in the Flood Risk Assessment. Drainage Maintenance Strategy. Sustainable drainage systems (SuDS) design.

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
		Drying out and cracking of earthworks and soils; subsidence during drought events causing damage to buildings.	All foundations are supported on the underlying bedrock.	Design drawings.
	Temperature	Damage to structural components / façade materials from extreme temperatures.	The primary structure is all within a thermal envelope to provide protection from extreme temperatures.	Design drawings.
		Damage to electrical equipment / ancillary equipment from extreme temperatures causing damage and loss of service.	The design will incorporate local split aircon systems in the comms rooms. Other electrical equipment rooms such as the LV switchrooms and substations shall utilise natural ventilation where they are located on external elevations. To futureproof the installations, space provision will be allocated in the basement to EIA Site future local split aircon units to serve the switchrooms as required.	Design drawings. Future adaptive management planning.
		Changes in humidity which may result in damage to buildings, mould growth.	Ventilation rates are considered in accordance with Building Regulation, Part F. Condensation Risk Analysis will be undertaken at technical design work stage where deemed necessary to mitigate risk.	Building Regulation, Part F and design specification.
	Wind	High winds resulting in instability of buildings and/ or damage to buildings.	Structural wind loading analyses carried out as part of a physical wind tunnel testing campaign. Wind modelling of the structure has been used to design the overall stability systems, including stability, acceleration and lateral displacement. Façade pressure analyses carried out as part of a physical wind tunnel testing campaign. The analysis considers extreme wind speeds (for a range of return periods) that will be used in the post-processing of the measured wind tunnel data and will be derived from a basic wind speed of 22.6m/s (10-min mean at 10m height in open country terrain) – a wind speed that is compliant with the requirements of the UK National Annex (NA) to BS EN 1991-1-4:2005 + A1:2010. Code-specific altitude, probability and directional factors as well as the influence of terrain roughness up-wind of the EIA Site will also be considered.	Wind load analysis and design specification.

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
		Lightning strike damaging plant and equipment or power loss.	A Lightning Protection Sub-Contractor has been appointed. The Sub-Contractor is to supply, install and test an air termination network at roof level to which all plant and equipment will be bonded, a down-conductor system which will utilise reinforcement bars within the building structure and an earth termination system in line with BSEN 62305 parts 1, 3 and 4 2011, part 2 2012 and mechanical and electrical Consultant's Design's Stage 3 Report.	Design standards (BSEN 62305 parts 1, 3 and 4 2011, part 2 2012). Design specification.
Public Realm	Precipitation	Flooding or overwhelmed drainage in public realm causing damage.	The public realm is designed with permeable paving which is combined with a 30% void stone foundation which acts to provide attenuation during the larger storm events, up to the 1 in 100-year event. Within the design of the attenuation below the public realm an allowance of 45% has been included to account for climate change. A large proportion of the landscape is proposed as a podium landscapes. Incorporation of blue roof systems will be explored where water can be attenuated above the podium slab to capture increased seasonal water.	Flood risk assessment. Detail planting plans and landscape management and maintenance reports.
		Damage to vegetation from waterlogging, flooding or drought conditions.	Tree, shrub and perennial plant species will be selected to suit both Plot D's and Phase 3's climatic orientation e.g. landscapes facing the predominate wind / rain direction. Detail planting plans and landscape management and maintenance reports will be provided as part of the detail proposals. Consideration of planting close to the façade and façade run off will also be considered. The most recent Horticultural and government body guidance on planting for resilience will be applied when specifying landscaping. Planting will need to be replaced during the schemes life span due to stock becoming woody or dying. This is common practice in landscape settings. Planting failures and successes should be documented through the life span of the development and the planting modified as emerging climatic strategies are established in the future.	Detail planting plans and landscape management and maintenance reports.

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
	Temperature	Damage to vegetation from increased temperatures.	Tree, shrub and perennial plant species will be selected to suit both Plot D's and Phase 3's seasonal sun and shade patterns. Reference to the most recent Horticultural and government body guidance on planting for resilience will also be addressed through detail planting plans and landscape management and maintenance reports. Planting will need to be replaced during the schemes life span due to stock becoming woody or dying. This is common practice in landscape settings. Planting failures and successes should be documented through the life span of the development and the planting modified as emerging climatic strategies are established in the future.	Detail planting plans and landscape management and maintenance reports.
	Wind	Fallen / damaged trees.	Planting will need to be replaced during the schemes life span due to stock becoming woody or dying. Reference to the most recent Horticultural and government body guidance on planting for resilience will also be addressed through detail planting plans and landscape management and maintenance reports.	Landscape management and maintenance reports.
End users	Precipitation	Flooding and overwhelming of drainage resulting in access and egress issues.	Refer to drainage mitigation under Buildings and Public Realm. A drainage maintenance strategy is provided within the flood risk assessment (FRA). The Maintenance Strategy details the minimum requirements for permeable paving and attenuation tanks which form most of the drainage network. Post development surface water run-off rates will be managed and mitigated through the implementation of SUDs.	Drainage Maintenance Strategy. Sustainable drainage systems (SuDS) design.
	Temperature	Damaged to electrical equipment / ancillary equipment from extreme temperature resulting in loss of services	The design will incorporate local split aircon systems in the comms rooms. Other electrical equipment rooms such as the LV switchrooms and substations shall utilise natural ventilation where they are located on external elevations. To futureproof the installations, space provision could be allocated in the basement to EIA Site future local split aircon units to serve the switchrooms as required.	Design drawings. Adaptive future planning.

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
		Overheating resulting in heat stress, or uncomfortable living / working conditions.	CIBSE TM59 methodology⁴⁹ is being utilised to assess the overheating risk for the development. Compliance with TM59 minimum criteria is being analysed using the Manchester weather Centre data. Measures include: - Optimised glazing g value to limit propensity to overheat as consequence of solar gain. Summer by-pass incorporated within Mechanical Ventilation with Heat Recovery (MVHR) systems. - Calculated ventilation rates within apartments designed to provide sufficient air changes to maintain occupant comfort. - All dwellings specified with solar blinds as part of base build spec.	TM59 methodology and associated design specification.
		Exposure of end users to sunlight / UV in public realm areas.	Covered walkways and street tree planting provided. The colonnade to Phase 3 allows users to walk through a covered and shaded route from Owen Street through to Crown Street Park. This allows both shade from the sun and shelter from the rain. The use of street tree planting will further offer shading to the street and help cool the air at street level. The nature of the tall towers also provides large shade patterns.	Detail planting plans and landscape management and maintenance reports.
		Changes in humidity which may result in health problems, mould growth.	Ventilation rates are considered in accordance with Building Regulation, Part F. Condensation Risk Analysis will be undertaken at technical design work stage where deemed necessary to mitigate risk.	Building Regulation, Part F and design specification.

⁴⁹ Assessing overheating risk in residential developments is a complex issue. Hence, the CIBSE TM59 recommendation that comfort conditions are separately assessed if it is felt that there could be a risk. The TM59 methodology is a standardised approach to predicting overheating risk for residential building designs using dynamic thermal analysis. The aim is to produce a test that encourages good design that is comfortable within sensible limits, without being so stringent that it over promotes the use of mechanical cooling. The Methodology is intended for use by designers in order to influence building design for the better. It could be used at planning stage to assess risk, as well as at later design stages.

This methodology will:

- Allow different designs to be compared based on reasonable assumptions.
- Support design decisions that improve comfort without cooling
- Provide consistency across the industry for overheating risk prediction

Receptor	Climate variable	Associated climate risk / impact	Description of embedded mitigation	Commitment of evidence (if available)
	Wind	Fallen / damaged trees impacting on end users use of public realm areas.	Pedestrian-level wind study using Computational Fluid Dynamics (CFD). The study uses the Lawson LDDC criteria, which is a de-facto standard in the UK for assessing pedestrian wind safety and comfort. The analysis uses 20 years of wind data from Manchester airport, transposed to the EIA Site. Planting will need to be replaced during the schemes life span due to stock becoming woody or dying. Reference to the most recent Horticultural and government body guidance on planting for resilience will also be addressed through detail planting plans and landscape management and maintenance reports.	Wind modelling and design specification. Landscape management and maintenance reports.

Sensitivity Assessment

- 5.153. Precipitation – the Scheme may be sensitive to changes in average rainfall and extreme rainfall events. Flooding (pluvial or fluvial) may lead to flooding on EIA Site, potentially causing deterioration of materials and increased maintenance requirements. Extreme rainfall events may also lead to destabilisation of soils and earthworks, potentially causing damage to the building structure and surrounding infrastructure. Damp buildings can lead to mould growth resulting in health issues for end users. Prolonged dry periods may lead to drying out and cracking of earthworks and soils.
- 5.154. Temperature – Buildings are sensitive to extreme temperatures. High temperatures may cause damage to paved surfaces, including potential melting and deformation of surface asphalt as well as more rapid deterioration of materials and associated ancillary components, such as safety barriers and signage. Soil stability can be reduced as a result of extreme temperatures and drought which can cause soils to dry out and crack and lose integrity. High temperatures can impact end users (e.g., reduction in thermal comfort, lack of concentration and reduction in productivity).
- 5.155. Humidity – increases in humidity can affect the moisture content of materials in buildings leading to deterioration and increase maintenance requirements. Changes in humidity can also cause health problems to end users.
- 5.156. Wind – high winds and storms can affect the stability of above-ground infrastructure and hasten material degradation due to wind-driven rain infiltration. Pedestrians may also be sensitive to high winds and associated ancillary components such as signage or signals could also be damaged by high winds or lightning strike.
- 5.157. Based on the embedded mitigation measures, Table 2231 **Error! Reference source not found.** summarises the sensitivity of the Proposed Development to changes in climate variables. Sensitivity considers the impact of climate change on the specific receptors taking into account the embedded design measures as detailed in the below table.

Table 22 Sensitivity Assessment

Climate Variables		Sensitivity of Components			
		Construction	Operation		
		Construction EIA Site / Workers	Buildings	Public Realm	End users
Precipitation	Change in annual average	Low	Low	Low	Low
	Drought	Low	Low	Low	Low
	Extreme precipitation events	Low	Low	Low	Low
Temperature	Change in annual average	Low	Low	Low	Low
	Extreme temperature events	Low	Low	Low	Low
Wind	Gales and high winds	Low	Low	Low	Low
	Storms	Low	Low	Low	Low
Relative Humidity	Change in annual average	Low	Low	Low	Low
	Evaporation	Low	Low	Low	Low

Exposure Assessment

- 5.158. Based on the baseline climate and climate change information presented, Table 2332 summarises the exposure of the Proposed Development to change in climate variables. Exposure considers the current climate and the future projections identified in the Baseline Sections (Current Baseline and Future Baseline).

Table 23 Exposure assessment

Climate Variable		Construction phase	Operation phase
Precipitation	Change in annual average	Low	Medium
	Drought	Low	Medium
	Extreme precipitation events	Medium	High
Temperature	Change in annual average	Low	Medium
	Extreme temperature events (cold snaps, heatwaves)	Medium	High
Wind	Gales and high winds	Medium	Medium
	Storms	Medium	Medium
Humidity	Change in annual average	Low	Low
	Evaporation	Low	Low

Vulnerability Assessment

- 5.159. In order to determine the receptors which should be scoped in and scoped out of further assessment, a vulnerability assessment has been undertaken (Table 24). The vulnerability assessment is based on the exposure and sensitivity of the Proposed Development to climate change (Table 1632). Receptors deemed to be of 'medium' and 'high' vulnerability would be scoped into further assessment and those with 'low' vulnerability are scoped out.

Table 24 Vulnerability assessment

Receptor	Variable		Sensitivity	Exposure	Vulnerability
Construction EIA Site / workers	Precipitation	Change in annual average	Low	Low	Low
		Drought	Low	Low	Low
		Extreme precipitation events	Low	Medium	Low
	Temperature	Change in annual average	Low	Low	Low
		Extreme temperature events	Low	Medium	Low
	Wind	Gales and high winds	Low	Medium	Low
		Storms	Low	Medium	Low
	Humidity	Change in annual average	Low	Low	Low
		Evaporation	Low	Low	Low
Buildings	Precipitation	Change in annual average	Low	Medium	Low
		Drought	Low	Medium	Low

Receptor	Variable		Sensitivity	Exposure	Vulnerability
	Temperature	Extreme precipitation events	Low	High	Low
		Change in annual average	Low	Medium	Low
		Extreme temperature events	Low	High	Low
	Wind	Gales and high winds	Low	Medium	Low
		Storms	Low	Medium	Low
	Humidity	Change in annual average	Low	Low	Low
		Evaporation	Low	Low	Low
Public Realm	Precipitation	Change in annual average	Low	Medium	Low
		Drought	Low	Medium	Low
		Extreme precipitation events	Low	High	Low
	Temperature	Change in annual average	Low	Medium	Low
		Extreme temperature events	Low	High	Low
	Wind	Gales and high winds	Low	Medium	Low
		Storms	Low	Medium	Low
	Humidity	Change in annual average	Low	Low	Low
		Evaporation	Low	Low	Low
End Users	Precipitation	Change in annual average	Low	Medium	Low
		Drought	Low	Medium	Low
		Extreme precipitation events	Low	High	Low
	Temperature	Change in annual average	Low	Medium	Low
		Extreme temperature events	Low	High	Low
	Wind	Gales and high winds	Low	Medium	Low
		Storms	Low	Medium	Low
	Humidity	Change in annual average	Low	Low	Low
		Evaporation	Low	Low	Low

- 5.160. From the outcome of the vulnerability assessment, and taking into account the embedded mitigation measures, the vulnerability assessment has identified no medium or high vulnerability receptors, as such, no further assessment is required.

- 5.161. A summary for each receptor is provided with recommendations for measures to ensure climate risks are appropriately managed throughout the construction and operation of the Proposed Development.

Table 25 Summary of Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)
Construction EIA Site / Workers	Impact of climate change on construction EIA Site and workers.	Overwhelmed drainage, waterlogging of materials, disruption to EIA Site access causing programme delays, loss of materials and access/egress issues, increased dust generation, welfare and safety concerns when working at height, or using cranes.	C
The following measures – which may ensure that the construction EIA Site, compound and workers are better prepared for extreme weather events and more resilient to climate hazards – are recommended in the construction management plan: - Any stockpiled materials are managed to prevent loss or damage of materials from precipitation or storm events. This may include sealing spoil heaps and stockpiles shortly after excavation and formation, covering spoil and material heaps in advance of predicted storms, regular inspection in advance, during, and following, extreme weather events (e.g., storms, and heatwaves); - Provide adequate rest, shade and Personal Protective Equipment (PPE) – such as hats and sun cream, and drinking water – for the workforce during periods of high temperature and high solar radiation; - Adjusting the programme of work activities or scheduling daily working time to account for extreme weather conditions such as high winds, heavy precipitation and high temperatures, building additional contingency into the programme; - Switching-off machinery when not in use to avoid the risk of overheating; - Collect and store rainwater to support the supply of water (from mains) used for other supporting functions (e.g., washing/cleaning of machinery; irrigation for any planted areas); - Ensuring access roads used during construction are monitored, especially during periods of heavy rainfall and appropriate traffic management put in place to avoid areas of potential flooding. Local advice from the council or traffic authority regarding traffic management measures that may be required during times of extreme weather would be taken and implemented; and - Ensuring the management protocols of the construction team – including overall management and any civil works contractors employed – are able to be proactive to take action in advance of the forecasting of extreme weather events. Furthermore, management plans on EIA Site need to be flexible and adaptable during the construction process. They also need to be included in, and networked into, the existing emergency response plans at the region, County, town or project level – and generally aligned with any corporate/group/head office requirements of the proponent's construction management team. Based on the implementation of construction management plan, the risk to the construction EIA Site and workers is considered to be low.			
It is expected that the Main Contractors environmental plan (or similar document(s)) will include the above measures in relation to potential climate risks to the construction phase. As such the construction phase has been scoped out of further assessment.			
Buildings	Impact of climate change on buildings (residential and office space)	Flooding and overwhelmed drainage causing damage to buildings, access and egress issues, changes in soil stability or subsidence, damage or deformation of building materials and equipment from extreme temperatures, mould growth, instability or damage from high winds.	O

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)
		The following measures are recommended to ensure that the buildings are more resilient to climate hazards: • An operation and maintenance (O&M) manual (or similar document) should be developed and implemented to ensure regular maintenance of building materials and infrastructure, electrical and ancillary equipment, clearing and upkeep of drainage infrastructure is undertaken. • Monitoring of weather warnings to ensure building fabric and ancillary/ electrical equipment is secured (in the even to storms), or adequately protected from extreme precipitation or temperature events. • Measures to inspect and monitor the building fabric after extreme events (precipitation, temperature, high winds or storms) should be incorporated into planned and preventative maintenance (PPM) schedules. • As replacement of building materials, components, ancillary or electrical equipment is required, climate risks should be considered to ensure replacements are suitable for the climate scenario and design life projections at that time.	
		It is expected that O&M and PPM schedules will include the above measures in relation to potential climate risks to buildings during operational phase. As such climate risks on building receptors has been scoped out of further assessment.	
Public Realm	Impact of climate change on Public Realm	Damage to public realm from flooding or overwhelmed drainage, damage to vegetation, fallen or damaged trees	O
		The following measures are recommended to ensure that the public realm areas are more resilient to climate hazards: • Where replacement planting is required, ensure plant selection is suitable for the climate projections for the anticipated lifetime of the plants. • The PPM schedule should include for regular management of trees to reduce the risk of fallen trees or branches during high winds or storm events.	
		It is expected that O&M or PPM schedules will include the above measures in relation to potential climate risks to the public realm during operational phase. As such climate risks on public realm receptors has been scoped out of further assessment.	
End Users	Impact of climate change on	Flooding or overwhelmed drainage causing access / egress issues, loss of services from electrical equipment, increased risk of trip hazards from deformation of surfaces, heat stress, or uncomfortable living / working conditions, exposure of end users to sunlight / UV in public realm areas, Changes in humidity which may result in health problems, mould growth.	O
		The following measures are recommended to ensure that the end users are more resilient to climate hazards: • Continuity or emergency plans should be developed to ensure that risks from extreme precipitation or flooding are considered to ensure that access/egress arrangements for end users (residents, office workers, visitors, emergency services) are maintained. Furthermore continuity or emergency plans should ensure measures are in place to manage effects of power loss. • Regular monitoring of weather warnings can be used to provide an early warning system to manage risks from extreme temperatures, precipitation or storms.	

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)
	- Monitoring of weather warnings to ensure public realm areas are (in the even to storms), or adequately protected from extreme precipitation or temperature events. - Measures to inspect and monitor pedestrian areas to many any trip hazards caused by extreme events (precipitation, temperature, high winds or storms) should be incorporated into planned and preventative maintenance (PPM) schedules. - Effects of heat stress and comfort of living and working areas should be monitored to manage long term increases in temperature, with adaptive measures incorporated as necessary in planned refurbishment or replacement works.		
	It is expected that O&M or PPM schedules will include the above measures in relation to potential climate risks to end users during operational phase. As such climate risks on end users receptors has been scoped out of further assessment.		

Part One (Green House Gases) and Two (Climate Vulnerability) Summary for Climate Change

- 5.162. Climate Change Green House Gases have been scoped in for EIA.
- 5.163. The vulnerability assessment is based on the exposure and sensitivity of the Proposed Development to climate change. Receptors deemed to be of 'medium' and 'high' vulnerability would be scoped into further assessment and those with 'low' vulnerability are scoped out. In summary, all receptors are considered to be of 'low' vulnerability.
- 5.164. For that reason, Climate Vulnerability has been scoped out of this assessment.

Daylight, Sunlight & Overshadowing

Introduction

- 5.165. This Chapter of the ES will be prepared by GIA and assesses the likely daylight, sunlight and overshadowing impacts of the Proposed Development upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.166. The author of this input is Michael Beatty, a Partner at GIA. Michael has a BSc (Hons) degree in Building Surveying and is a Member of the Royal Institution for Chartered Surveyors. Michael has provided daylight and sunlight input on EIAs for several large-scale developments in Manchester city centre and elsewhere in the country.

Assumptions and Limitations

- 5.167. Where actual room layouts are available on the planning portal, these will be considered in regard to the modelling of the internal layouts within the existing surrounding properties. Where layout information is not available, assumptions will be made as to the use and internal configuration of the rooms (from external observations during an EIA Site inspection) behind the fenestration observed.
- 5.168. Floor levels will be assumed for adjoining properties assessed, where access has not been obtained. This dictates the level of the working plane which is relevant for the NSL assessments.

Legislative and Policy Context

Legislation

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

National Planning Policy and Guidance

National Planning Policy

Revised National Planning Policy Framework 2021

- 5.170. 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."*

- 5.171. The National Planning Policy Framework (NPPF) adopted on 27 March 2012 and updated on 20 July 2021 stipulates that *“...planning policies and decisions should always seek to secure a good standard of amenity for existing and future occupants of land and buildings.”*
- 5.172. Paragraph 123 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 EIA Site. In these circumstances:*
- [...]*
- c) In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a Site (as long as the resulting scheme would provide acceptable living standards).”*

The National Planning Practice Guidance (NPPG) 2021

- 5.173. The National Planning Practice Guidance (NPPG) – Making Efficient Use of Land, published on 24 June 2021, 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.”*
- 5.174. 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”.*

Local Planning Policy and Guidance

Manchester Core Strategy (2012 – 2027)

- 5.175. 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.
- 5.176. 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)

- 5.177. 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.
 - EIA 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.

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

- 5.178. The Building Research Establishment (BRE) Guidelines ‘EIA Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2022, 3rd edition’ (released June 2022) provides advice on EIA Site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them. It is intended for use by building designers, developers, consultants and Local Planning Authorities (LPAs). The advice it gives is not mandatory and should not be used as an instrument of planning policy, it states:
- “This guide is a comprehensive revision of the 2011 edition of EIA 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.”*
- 5.179. 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).

- 5.180. 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 Daylight in buildings, BS EN 17037 and the CIBSE Publication LG 10 Daylighting – a guide for designers”.

Consultation

- 5.181. No consultation has been undertaken thus far.

Assessment Methodology and Significance Criteria

Scenarios to be Tested

- 5.182. The following properties will be considered due to their proximity to the EIA Site and their residential use:
- Deansgate Square
 - Plot F, Great Jackson Street
 - Plot G, Great Jackson Street
 - The Blade
 - The Circle
 - Elizabeth Tower
 - Victoria Residence
 - Deansgate South
 - Castlegate Apartments
 - Castle Wharf
 - School House, Jackson Crescent
 - City South
 - Lumiere
 - Crown Street Primary School
- 5.183. The assessment has considered other residential properties within the vicinity and due to the distance and orientation from the proposed development, they are unlikely to be affected, so they will not be assessed in detail.
- 5.184. The following scenarios will be assessed and considered, and are reported within this Chapter of the ES:
- Scenario 1: Baseline; and
 - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative.
- 5.185. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of ‘Phase 1 Plot D2 Office Building’ was to come later in the programme. We have considered this with regard to Daylight, Sunlight & Overshadowing discipline and changes to the sequencing of ‘Phase 1 Plot D2 Office Building’ would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Daylight, Sunlight & Overshadowing discipline will be testing the development as a whole.
- 5.186. As the potential for daylight, sunlight and overshadowing increases with the introduction of each phase of the Proposed Development, assessing the Proposed Development in its entirety, as well as surrounding cumulative schemes, represents a worst-case scenario.
- 5.187. Schemes under construction and with planning consent but not under construction will be included in the baseline scenario, in line with the BRE Guide, and so no separate technical assessment of the cumulative impact is required.
- 5.188. An overshadowing assessment will be undertaken on the amenity areas within Deansgate Square and adjacent to Blade/The Circle and Plot F.

The Study Area

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

Baseline Surveys and Assessment

- 5.190. Baseline studies are currently being undertaken by GIA. The baseline assessment will review the daylight and sunlight conditions within each of the surrounding residential properties in the Proposed Development area's present form, in accordance with BRE guidance.

Significant Criteria Effects

- 5.191. 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."*

- 5.192. 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."

- 5.193. The BRE Guidelines do not provide any guidance on what constitutes a moderate adverse impact.
- 5.194. 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.
- 5.195. The initial numerical criteria for determining the magnitude of effect is based on percentage alterations, as follows:

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

Magnitude of Effect	Percentage Alteration from Baseline
Major	40%+

Sensitivity of Identified Receptor

- 5.196. It is important that the location and nature of the EIA Site and surrounding area 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.
- 5.197. 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 EIA Site reside in a city centre location where there is an expectation for a higher density of development, as illustrated by the endorsed SRF, which has identified the area for regeneration since its first iteration in 2007.
- 5.198. The EIA Site is currently occupied by low-rise buildings, meaning it is underdeveloped and unusually open aspect given the city centre location. These receptors are therefore deemed to have a medium to low sensitivity.
- 5.199. The following existing receptors are defined as having a medium sensitivity:
- Deansgate Square
 - Castlegate Apartments
 - Castle Wharf
 - School House, Jackson Crescent
 - Elizabeth Tower
 - Victoria Residence
 - Lumiere
 - City South
- 5.200. The following receptors are not yet constructed or completed and, as such, are defined as having a low sensitivity:
- Plot F, Great Jackson Street
 - Plot G, Great Jackson Street
 - The Blade
 - The Circle
 - Deansgate South
 - Crown Street School (not residential = low sensitivity)

Significance of Effects

- 5.201. 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 35 Summary of Sensitivity Receptors and Magnitude

Magnitude	Sensitivity		
	High	Medium	Low
Major	Major Adverse / Beneficial*	Major Adverse / Beneficial*	Minor Adverse / Beneficial
Moderate	Major Adverse / Beneficial*	Moderate Adverse / Beneficial	Minor Adverse / Beneficial

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

- 5.202. When assigning significance criteria for daylight and sunlight effects, professional judgement has been used. Consideration has been given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, sensitivity of the receptor, and any other relevant factors. There may be mitigating factors such as location and nature of development, balconies, overhangs or design features which may also affect the determination of assigning the criteria.
- 5.203. 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.

Source of Effect

- 5.204. The height, scale and massing of the Proposed Development may result in obstructions to daylight and sunlight to the surrounding buildings and amenity areas.

Baseline Conditions

- 5.205. The Crown Street Phase 3 application EIA Site comprises a part cleared site, the Renaker Marketing Suite and Manchester Carers Forum (Gaddum House). Plot D comprises a temporary concrete batching plant for the manufacture and distribution of ready mixed concrete.

Potentially Significant Effects

Table 36 Summary of Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Deansgate Square	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Plot F, Great Jackson Street	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Plot G, Great Jackson Street	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
The Blade	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
The Circle	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Elizabeth Tower	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Victoria Residence	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Deansgate South	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Castlegate Apartments	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Castle Wharf	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
School House, Jackson Crescent	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In
Deansgate Square	Reductions in daylight and sunlight	The height, scale and massing of the Proposed Development may result in reductions to daylight and sunlight.	O	In

5.206. For completeness, the following Committed Developments are considered relevant and included in the assessment:

- Deansgate Square
- Crown Street Phase 2 (Blade and 360)
- Plot H, Great Jackson Street
- Plot G, Great Jackson Street
- Bridgewater House, Great Jackson Street
- Plot F, Great Jackson Street
- Arundel Street/St George's Place

Noise and Vibration

Introduction

- 5.207. This Chapter of the ES will be prepared by Fisher Acoustics Ltd and assesses the likely noise and vibration impacts of the Proposed Development upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.208. The author of this input is a Chartered Engineer, holds a First Class Bachelor of Engineering in applied acoustics and has 31 years' post-graduate experience in acoustic consultancy, including the compilation of EIA Chapters for numerous large-scale developments.

Assumptions and Limitations

- 5.209. As part of the overall study of noise and vibration, a quantitative assessment of the potential noise levels generated by construction activities will be carried out. The assessment will be based on the potential construction programme and information received relating to the number and type of plant items expected on EIA Site over the construction programme.
- 5.210. 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 construction tasks that must be undertaken and the plant items that will be required to undertake these tasks.

Legislative and Policy Context

Legislation

- 5.211. The Control of Pollution Act 1974 contains powers for local authorities to deal with noise and vibration from construction and demolition EIA Sites. Prior consent for demolition and construction activities can be granted under Section 61 of the Act.
- 5.212. 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 (February 2019).
- 5.213. 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.
- 5.214. 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 and Guidance

- 5.215. 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'.
- 5.216. Para. 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."
- 5.217. Para. 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 EIA 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.”

- 5.218. The National Planning Policy Framework document cross references the 'Explanatory Note to the Noise Policy Statement for England'. The 'Noise Policy Statement for England' (NPSE) was published by the Department for Environment Food and Rural Affairs in March 2010. The NPSE states that the long-term vision of Government noise policy, is to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'. The NPSE also states that 'This long-term vision is supported by the following aims:
- 5.219. Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life.
- 5.220. The NPSE does not give suggested external noise criteria for 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

- 5.221. '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.
- 5.222. The document identifies the subjective grading of noise and the recommended actions and different effect levels.

Local Planning Policy and Guidance

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

- 5.223. 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.
- 5.224. 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.”*
- 5.225. Saved policy DC26.1 from the Unitary Development Plan states:
- 5.226. *“New noise-sensitive developments (including large-scale changes of use of existing land or buildings), such as housing, schools, hospitals or similar activities, will be permitted subject to their not being in locations which would expose them to high noise levels from existing uses or operations, unless the effects of the noise can realistically be reduced. In giving effect to this policy, the Council will take account both of noise exposure at the time of receiving a planning application and of any increase that may reasonably be expected in the foreseeable future.”*

'Planning & Noise, Technical Guidance' issued by MCC, June 2022

- 5.227. 'Planning & Noise, Technical Guidance', dated June 2022 has been issued by the Environmental Protection, Environmental Health and The Neighbourhoods Service sections of MCC. 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.
- 5.228. 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 EIA 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 2019 update)
- National Planning Policy Guidance (2014)
- WHO (1999) Guidelines for Community Noise

Manchester City Council - Noise from construction and demolition EIA Sites

- 5.229. MCC provides outline information on the control of noise pollution from construction EIA Sites in an undated guidance document entitled 'Guidance on completing an application for prior consent; Noise from construction and demolition EIA Sites'.
- 5.230. 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 MCC are likely to employ when assessing planning applications.
- 5.231. 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 EIA 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

- 5.232. 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

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

BS 6472: 2008

- 5.234. 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

- 5.235. BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings' provides appropriate criteria for acceptable levels of noise within different building types. In relation to schools, the document advises that guidance is available in Building Bulletin 93 issued by the Department for Education.

Other Guidance

Design Manual for Roads and Bridges

- 5.236. LA 111 'Noise and Vibration' of the Design Manual for Roads and Bridges (DMRB), issued May 2020 highlights methods for the assessment of traffic noise levels and advises on the impact magnitude of changes in noise levels.

- 5.237. The DMRB advises that the threshold criteria used for traffic noise assessment during the day is a permanent change in magnitude of 1.0 dB LA10,18h in the short term (i.e. on opening) or a 3.0 dB LA10,18h change in the long term (15 years after project opening).

Consultation

- 5.238. The Environmental Health section of MCC has been contacted in order to advise the proposed assessment methodology to determine the potential noise and vibration impacts of the development.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.239. Given the proposed phasing, the potential worst-case scenario will be tested, as follows:
- Scenario 1: Baseline; and
 - Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 +cumulative.
- 5.240. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to Noise and Vibration discipline and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Noise and Vibration discipline will be testing the development as a whole.
- 5.241. The assessment will consider a realistic construction programme for the phases.

The Study Area

- 5.242. The Proposed Development sits within the jurisdiction of MCC. The main noise sources affecting the Proposed Development and surrounding sensitive receptors are:
- Road traffic on the A57(M) to the south and west of the EIA Site;
 - Road traffic on Chester Road to the north of the EIA Site; and
 - Road traffic on Great Jackson Street, which bisects the EIA Site.
- 5.243. The noise and vibration sensitive receptors around the EIA Site which are to be included in the assessment are summarised below.
- Deansgate Square residential dwellings;
 - Crown Street Phase 1 residential dwellings;
 - Crown Street Phase 2 residential dwellings; and
 - Great Jackson Street, Plot F residential dwellings.
- 5.244. Whilst there are other receptors around the EIA Site, these other receptors are at greater distances 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 EIA Site.

Baseline Surveys and Assessment

- 5.245. Noise surveys at and around the EIA Site have been carried out to determine the prevailing levels of environmental noise able to affect the pre-existing noise-sensitive receptors and the proposed dwellings. The surveys have included the measurement of noise from the A57(M) over several days and nights to determine the long-term levels of noise from this major source of noise in the area. The surveys have been conducted in general accordance with BS 7445-1 2003; 'Description and measurement of environmental noise'.
- 5.246. A 3D computer model of the proposed and existing buildings at and around the EIA Site has been constructed in order to calculate the expected noise levels at the facades of the proposed residential towers. The results of the noise surveys have been used as the input to the model.

Significant Criteria Effects

- 5.247. Potentially sensitive noise and vibration receptors on and around the EIA Site will be identified and categorised in relation to sensitivity in accordance with EIA terminology, as illustrated in Table 2635.

Table 26 Receptor sensitivity

Sensitivity of receptor	Description
High	Residential properties, hotels and hostels
Medium	Commercial, health care and educational buildings
Low	Residential amenity areas, retail buildings and industrial buildings

- 5.248. The magnitude of impact shall be defined in accordance with recognised noise and vibration guidance and corresponding EIA terminology (Major, Moderate, Minor, Negligible), as identified in Table 27 35.
- 5.249. In terms of nature and scale of effects, effects will be defined as either adverse, beneficial or neutral in nature.
- 5.250. The scale of effects will refer to guidance within the Noise Policy Statement for England (NPSE), the decision making includes identifying whether the overall effect of the noise exposure generated by a development is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level. The definitions for the different effect levels are outlined below:
- Significant Observed Adverse Effect Level (SOAEL): The level of noise exposure above which significant adverse effects on health and quality of life occur.
 - Lowest Observed Adverse Effect Level (LOAEL): The level of noise exposure above which adverse effects on health and quality of life can be detected.
 - No Observed Effect Level (NOEL): The level of noise exposure below which no effect at all on health or quality of life can be detected.
- 5.251. Typically, effects (either before or after mitigation) that are major or moderate in scale shall be considered as 'significant effects' i.e., exceeds the LOAEL. The exception to this will be temporary non-permanent sources where a moderate effect would be considered acceptable as it does not exceed the SOAEL.

Table 27 Significance criteria for assessing operational noise impact

Effect Category	Increase in Noise Level	Description
Major Adverse	< 1.0	Noise increase is unlikely to be discernible
Moderate Adverse	1.0 to 2.9	A slight increase in noise levels may be perceived in affected buildings and outdoor recreational areas
Minor Adverse	3.0 to 4.9	Increase in noise levels is likely to be noticeable in affected buildings and outdoor recreational areas
Negligible	>5	Increase in noise level is likely to be clearly perceivable and could have a significant impact on the continued use of a building

- 5.252. For the assessment of noise associated with road traffic, reference will be made to the Calculation of Road Traffic Noise (CRTN). Further advice is also given in the Design Manual for Roads and Bridges (DMRB) for road traffic noise assessment. Significance criteria for assessing the traffic noise are presented in Table 2736, which is based on the IOA / IEMA 'Guidelines for Noise Impact Assessment.'
- 5.253. For the assessment of building services noise, reference will be made to the use of BS 4142:2014+A1:2019. Criteria for the assessment are set in accordance with BS 4142 and the Institute of Acoustics (IOA) / Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Noise Impact Assessment'.

Source of Effect

- 5.254. The potential sources of noise and vibration effects during the construction works and the completed development to be addressed in the ES will include:

- Temporary enabling and construction works associated with daytime and (if required) night-time works;
- Road vehicle movements generated during the construction works - associated with daytime and (if required) night-time works;
- Permanent fixed building services plant; and
- Amplified sound within proposed residential amenity uses and commercial spaces.

Potentially Significant Effects

5.255. Table 37 presents potentially significant effects on the identified sensitive receptors that will be assessed.

Table 28 Potentially significant effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase	Scoped In / Out
Residential Properties at Deansgate Square, Crown St Phase 1, Crown St Phase 2, Great Jackson Street Plot F	Noise nuisance due to construction activities	Noise from construction activities has the potential to result in nuisance and or adverse health effects due to disturbance of day-to-day activities	C	In
Residential Properties at Deansgate Square, Crown St Phase 1, Crown St Phase 2, Great Jackson Street Plot F	Vibration due to construction activities	Vibration due to construction activities has the potential to result in nuisance and or adverse health effects	C	In
Residential Properties at Deansgate Square, Crown St Phase 1, Crown St Phase 2, Great Jackson Street Plot F	Noise nuisance due to fixed building services plant	Noise from plant has the potential to result in nuisance and or adverse health effects due to disturbance of day-to-day activities and in the extreme can result in sleep disruption	O	In
Residential Properties at Deansgate Square, Crown St Phase 1, Crown St Phase 2, Great Jackson Street Plot F	Noise nuisance due to entertainment and activities	Noise from commercial and leisure facilities has the potential to result in nuisance and or adverse health effects due to disturbance of day-to-day activities and in the extreme can result in sleep disruption	O	In

5.256. For completeness, the following Committed Developments are considered relevant and included in the assessment:

- Deansgate Square
- Crown Street Phase 2
- Plot F, Great Jackson Street

Human Health

Introduction

- 5.257. This Chapter of the ES will be prepared by Enfusion and assesses the likely human health impacts of the proposals upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.258. The Author of this input is qualified with BSc, MSc, CEnv, FIEMA and over 25 years' experience in preparing for EIA developments. She is a co-author of the practical guide – the EIA Handbook (Telfords, Third Edition, November 2019).

Assumptions and Limitations

- 5.259. The overall approach proposed 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 will be desk-based and with professional judgment using published information. The Health Chapter will consider the findings relevant to human health of each technical impact assessment scoped into the Environmental Statement and likely to comprise - Air Quality; Climate Change; Daylight, Sunlight & Overshadowing; Solar Glare; Noise & Vibration; Townscape/Visual Impact; and Wind Microclimate; – and, as such, any key assumptions or limitations associated with each technical impact assessment are addressed within the individual chapters.

Legislative and Policy Context

- 5.260. The legislative context for each technical topic and of relevance to human health is considered in the section for that topic. The context specific to human health is, as follows:

National Planning Policy

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

- 5.261. 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.”*
- 5.262. Chapter 8 covers promoting healthy and safe communities, acknowledging that planning policies and decisions should aim to achieve healthy, inclusive and safe places which:
- “a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages.*
- b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas; and*
- “c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling.”* (paragraph 92).
- 5.263. 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).
- 5.264. *“Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and wellbeing of communities”* (paragraph 98). Sustainable transport should be promoted and this *“can help improve air quality and public health”* (paragraph 105). *“An effective use of land should be promoted in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions”* (paragraph 119). *“Developments should create places that are safe, inclusive and accessible and which promote health and wellbeing...”* (paragraph 130). *“New development must be appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health...”* (paragraph 185).

Public Health England (PHE) Strategy (2019)

- 5.265. 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

MCC Core Strategy (adopted 2012)

- 5.266. MCC's Core Strategy is the key document in Manchester's Local Development Plan. It is founded on a Vision to 2027 that includes *"an increased and sustainable healthy population..."*. Policies relevant to health are as follows:
- Policy SP1 Spatial Principles includes requirement that development should make a positive contribution to neighbourhoods including *"making a positive contribution to the health, safety and wellbeing of residents"*
 - Policy EC1 Employment and Economic Growth in Manchester requires development proposals to make the best possible use of a Site in terms of efficient use of space and including application of best practice in security design.
 - Policy EN4 seeks to reduce CO2 emission and reduce fuel poverty by enabling low and zero carbon development.
 - Policy EN8 Adaptation to Climate Change includes requirements to minimise flood risk and reduce urban overheating.
 - Policy EN9 Green Infrastructure provides guidance on provision of new, and improvements to, the quality and accessibility of existing green infrastructure assets.
 - Policies EN10 and 11 safeguard and create new open space, sport and recreation facilities.
 - Health is further protected through Policies EN14 Flood Risk, EN16 Air Quality, EN17 Water Quality, and EN18 Contaminated Land and 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"*.

Places for Everyone – Joint Development Plan (Greater Manchester Councils, submission draft 2021)

- 5.267. The Joint Development Plan (JDP) Vision includes Greater Manchester as *"a place where people live healthy lives"*; and *"a place at the forefront of action on climate change with clean air and a flourishing natural environment."* Strategic Objectives include No 10 *"to promote the health and wellbeing of communities"*. The JDP recognises that addressing health inequalities will require a diverse range of coordinated measures. The JDP supports improvements in health and wellbeing including through promoting a successful economy, enabling people to adopt healthier lifestyles, and reducing the risks to human health.

Great Jackson Street Development Framework (MCC 2007, updated 2015 & 2018)

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

Other Relevant Policy, Strategy & Guidance

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

- 5.269. 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)

- 5.270. 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”.

Consultation

- 5.271. Technical consultation will be undertaken where applicable for the technical topics and their relevance to human health. Further consultation regarding human health is not considered necessary and will not be undertaken.

Assessment Methodology and Significance Criteria

Scenarios & The Study Area

- 5.272. The Human Health studies will consider Scenario 13 - the worst-case scenario with the development phases all completed (baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative). It will also consider any significant implications for human health that may be identified from other technical studies testing other scenarios.
- 5.273. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of ‘Phase 1 Plot D2 Office Building’ was to come later in the programme. We have considered this with regard to Human Health discipline and changes to the sequencing of ‘Phase 1 Plot D2 Office Building’ would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Human Health discipline will be testing the development as a whole.
- 5.274. Different study areas will be used for the assessment of individual human health impacts, according to each relevant technical topic. Overall, the study area will be the EIA Site with local surrounds, and the wider study area of Manchester City for the themes for healthy urban living and based upon professional judgement.

Baseline & Assessment Methodology

- 5.275. The complexities of development planning for human health have been reported (Barton et al updated 2021) - this is due to the multiple determinants of health and wellbeing, and the need for cross-sectoral understanding and collaboration. There are linkages between the global ecosystem, the natural and built environments, the local economy with communities, people, and their lifestyles, and the likely interactions between different sectors.
- 5.276. There is no standard methodology for assessing health in EIA and the complexities of investigating health impacts are recognised, for example, by Public Health England (PHE, 2017) with their Wider Determinants of Health tool that details the multiple determinants for health and the need for cross-sectoral understanding. This guidance is primarily focused on spatial plan makers and public health practitioners, but the principles and checklist can be applied to major development proposals. The recent Health Impact Assessment in Spatial Planning (PHE, 2020) similarly focuses on spatial planning and SEA but does include an annex on integrating HIA in EIA and asserts the importance of a “proportionate and justified approach”. The EIA professional body Institute of Environmental Assessment & Management (IEMA) has prepared outline guidance for practitioners – determining Significance for Human Health in Environmental Impact Assessments (2022) - it is important that health in EIA is proportionate, balanced, and relevant.
- 5.277. It is considered that most of the factors addressed in development proposals can have impacts on health and quality of life/wellbeing – both positive and negative, and both physical and mental - through townscape, air quality, climate change resilience, flood risk, noise, provision of/accessibility to good quality housing and employment, health and community services, transport, and green infrastructure.
- 5.278. The overall approach to human health will be to consider the summary findings of each relevant technical topic and align these with their interconnectedness into the four themes for healthy urban planning – Healthy Housing; Active Travel; Healthy Environment; and Vibrant Neighbourhoods, as identified by the Healthy Urban Development Unit (HUDU) HIA Tool (4th edition 2019). The HUDU checklist comprises eleven topics based on broad determinants of health and wellbeing focused on the built environment and issues influenced by planning decisions. The HUDU checklist will be considered at the assessment stage with applicable criteria/questions for each of the topics.

- 5.279. Each technical impact assessment is subject to its own standards, regulations, and methods of assessment. The key findings from each topic will be considered such that any significant impacts for human health are clearly presented in a separate chapter. The key impacts for health will be considered and inter-relationships will be integrated within the four themes identified for healthy urban living.
- 5.280. Baseline data will be gathered from a range of publicly available sources of information and will draw upon local health and wellbeing information and priorities, for example, published local authority health profiles through Public Health England, and Office for National Statistics (ONS) for health and life expectancies, and as reported through the MCC Intelligence Hub. The proposed development is within the Deansgate Ward which records very good general health (2011) and is in a least deprived area according to the Index of Multiple Deprivation (2019). Availability of, and accessibility to, healthcare facilities, open/green space, and sustainable transport will be estimated using measurements in Google Maps. The key baseline from the other technical topics will be studied where relevant. It is not considered to be necessary to undertake primary research or surveys specific to the Human Health chapter. This is because the extent and nature of available information and the conclusions of other technical reports are sufficient to enable undertaking an appropriate and proportionate assessment of impacts on Human Health.

Potential Significant Effects

- 5.281. The health impact assessment will consider the direct implications for health such as the provision of development for employment, risks arising through pollution, air quality, or safety, together with the implications for health and wellbeing such as accessibility to healthcare facilities and sustainable transport (public, cycling and walking) for healthy living. It will further consider the wider implications for health and well-being, such as disturbance/nuisance, provision and accessibility to green infrastructure, amenity, cultural and recreational facilities. As relevant, the ES Human health chapter will report impacts associated with both the construction and the operational phases of the proposed development.
- 5.282. Potential significant effects associated with healthy buildings and a healthy local environment have been investigated through the EIA scoping process. Effects associated with contaminated land, flood risk, and heritage have been studied and the changes are not predicted to be significant in EIA terms. These topics are therefore proposed to be scoped out of the EIA; however, the technical studies will provide evidence to support the health impact assessment as necessary. Effects associated with Air Quality; Climate Change; Daylight, Sunlight & Overshadowing; Solar Glare; Noise & Vibration; Transport and Highways; and Wind Microclimate have the potential to be significant and are scoped into the EIA. Such effects are important for healthy buildings and a healthy local environment. Townscape and Visual Impact is also considered to be potentially significant in EIA. Such effects can be positive and/or negative with significance for human health and wellbeing and overall, contribute to a healthy local environment.
- 5.283. Active Travel is a key theme for healthy urban living. The proposed developments are well located for excellent existing public transport facilities, including both bus and Metrolink, and well connected for walking and cycling routes.
- 5.284. Access to local employment and healthy workplaces are key elements of Vibrant Neighbourhoods. Access to good quality housing is fundamental to the theme of Healthy Housing. Summary findings from relevant aspects of the socio-economics technical chapter will be integrated into the health chapter.
- 5.285. For each scoped-in technical chapter, the relevant committed developments will be considered and any elements applicable to human health will be considered, including any significant interactions within the four themes for healthy urban living.
- 5.286. Sensitive receptors will include future users and occupiers of the EIA Site and the surrounding local area, and will include:
- on Site workers during construction
 - existing residents and users/staffs of businesses, educational facilities, healthcare facilities, and communities around the EIA Site, as well as any other sensitive receptors identified by the technical assessments
 - future users and visitors of the EIA Site.
- 5.287. 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 considers the sensitivities of receptors as high, moderate, low. 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

5.288. Standardised sectoral thresholds and significance criteria will be used for each of the relevant technical factors that contribute to health and wellbeing. The overall likely significant effects on health will then be determined in a qualitative way using professional judgment.

Summary of Assessment of Scope

5.289. The proposed health impact assessment is proportionate and relevant, aligned with toolkits and guidance from PHE, the London HUDU, and IEMA. It will summarise the EIA findings from the other technical topics of air quality, climate change, daylight/sunlight/overshadowing, noise and vibration, socioeconomics, townscape and visual impact, and wind microclimate. It will address the interconnectedness of factors for health and consider the implications for human health and wellbeing according to the themes for healthy urban living – healthy housing; active travel; healthy environments; and vibrant neighbourhoods. The separate health impact chapter thus will demonstrate that human health has been explicitly considered and reported.

Solar Glare

Introduction

- 5.290. This Chapter of the ES will be prepared by GIA and assesses the likely Solar Glare impacts of the proposals upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.291. The author of this input has is a Senior Associate Partner at GIA and has 7 years of UK experience working on Solar Glare EIA matters for large-scale development throughout the UK. They have a Masters with Distinction in Building Science (MBS) from Victoria University of Wellington (New Zealand) and also have 7 years of NZ industry experience.

Assumptions and Limitations

- 5.292. Façade details are not yet known; however, the façade design of the Proposed Development is anticipated to comprise large areas of glazing which have the potential for solar glare effects.
- 5.293. Although great care has been 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. For practical reasons, the area of the assessment has been limited to the area surrounding the Proposed Development and professional judgement has been adopted. This area extends to a distance of approximately 500m around the EIA Site in all directions. At greater distances, the likelihood of solar reflections causing significant glare is reduced as the time that buildings will reflect is reduced and the area of façade visible constitutes a reduced angle and so reduces the possibility of the whole sun disk being reflected.

Legislative and Policy Context

- 5.294. 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)

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

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

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

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

- 5.296. 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...”

Consultation

- 5.297. No consultation has been undertaken.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.298. 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.
- 5.299. It is unlikely that phased solar reflections would be generated in isolation that do not occur in the complete and operational Proposed Development scenario. As such, the most appropriate scenario is considered to be Scenario 7 (Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6).
- 5.300. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of ‘Phase 1 Plot D2 Office Building’ was to come later in the programme. We have considered this with regard to Solar Glare discipline and changes to the sequencing of ‘Phase 1 Plot D2 Office Building’ would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Solar Glare discipline will be testing the development as a whole.
- 5.301. As the Proposed Development is a phased application, there is the potential that changes in the intended construction programme may occur. Due to the location of the buildings in relation to the sensitive viewpoints, and the angles of the facades, based on professional judgement, the residual effects are not expected to differ from those of the fully implemented Proposed Development, Scenario 7.
- 5.302. As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects. The construction scenario will be assessed qualitatively, based on professional judgement. As the worst-case scenario for solar glare is portrayed by the complete and operational development, a quantitative assessment has been undertaken for the operational phase only.

The Study Area

- 5.303. The assessment will consider potentially sensitive viewpoints for road and rail drivers surrounding the EIA Site. The viewpoints will generally be 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 will be 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.
- 5.304. Viewpoints within 500m of the EIA Site, where the Proposed Development is visible within the driver’s field of view will be assessed. At distances greater than 500m from the Proposed Development, instances of solar glare would be unlikely to occur. A review of the surrounding area has identified the following road junction and rail tracks as receptors sensitive to solar glare.

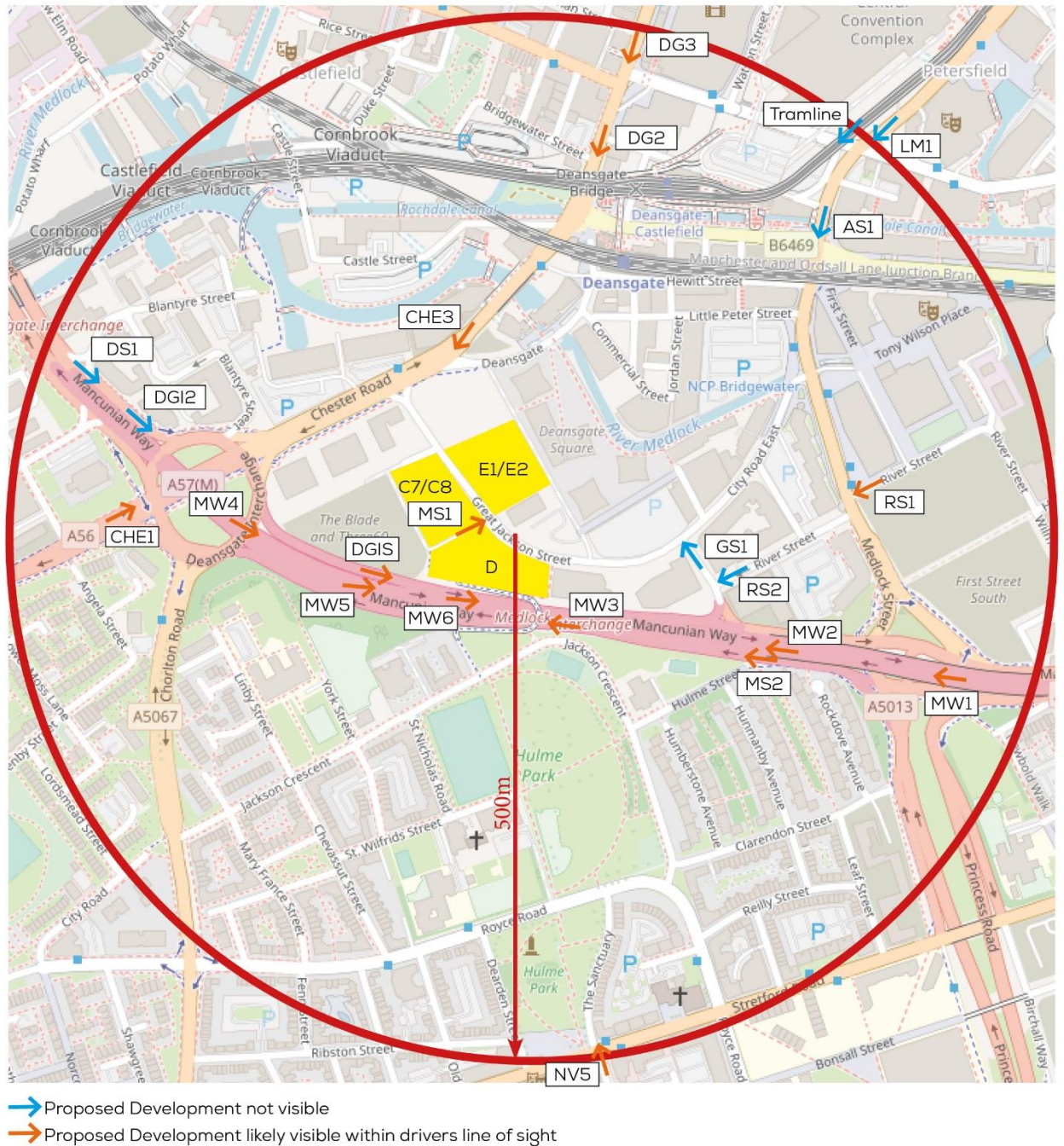


Figure 6 Solar Glare Receptor Locations

5.305. BRE states that reflected sunlight can affect occupants of adjoining buildings. There are two types of glare: disability glare, which is a safety issue; and discomfort glare, which includes solar reflections impacting adjacent buildings. Discomfort glare does not impair the ability to see. Whilst it can be important where work involves continuous viewing of the outdoor space from a fixed vantage point, it can generally be managed where glare is an issue by using blinds or curtains for the periods of time where such glare occurs. For these reasons, residential uses are classified as low-sensitivity receptors and do not require assessment as no residual significant adverse effects could occur.

- 5.306. Where analysis is undertaken, it would consider the total duration of time for which the sun can be reflected to the affected location per year. Durations of less than 50 hours per year are classified as being unlikely to lead to significant impacts. Some reflections from glazed buildings into surrounding buildings will inevitably occur in an urban context; however, it is highly unlikely that the proposed development would generate reflections that could impact any individual occupant in neighbouring buildings for 50 hours or more per year. Any discomfort glare that would occur would be entirely transient and short-lived as the sunpath moves past the EIA Site and could be managed by residents using blinds or curtains for those short periods where necessary. This is considered to be typical of the EIA Site's urban location and would potentially occur with any redevelopment proposal of the EIA Site that includes areas of glazing.
- 5.307. It is therefore considered that any impact on residential amenity is not expected to be significant and an assessment of discomfort glare is not considered necessary. Therefore, solar glare effects to occupants of neighbouring buildings is scoped out.

Baseline Surveys and Assessment

- 5.308. The solar glare assessment is undertaken on the worst-case scenario. Solar Glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Proposed Development. Therefore, the assessment considers the effect of the Proposed Development in absolute terms.
- 5.309. 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 development are included within the surrounding context as their completed form due to their construction having commenced:
- Crown Street Phase 2;
 - Viadux;
 - Plot 9 First Street;
 - 10-12 Whitworth Street; and
 - Arundel Street.
- 5.310. The assessment of solar glare identifies the time of the day and year that solar reflections will be visible from the assessed viewpoints, as well as their relationship to a driver's line of sight. The assessment does not however, measure the intensity of the reflection but merely the occurrence and duration.

Significant Criteria Effects

- 5.311. Drivers at each of the relevant road junctions are considered the sensitive receptors, where there are multiple directions of travel potentially affected, each direction of travel at the junction is considered a separate receptor as their effect significance may differ. For tram tracks, the tram drivers on the stretch of track are considered to be the sensitive receptor. The effect significance will be determined using professional judgement taking into consideration the duration of solar reflections, location of these in relation to a driver's line of sight, type of junction control and the probability of reflections occurring. The effect significance is given on a per junction basis considering all viewpoints assessed for that junction as well as any viewpoints that would not be affected by the Proposed Development.
- 5.312. There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. When assessing the overall significance of effect, the following factors could influence the nature, scale and resultant significance of effect:
- Sunlight availability probability;
 - Area of façade off which reflections are visible;
 - Period of time when reflections are visible;
 - Angle at which reflections are visible from line of sight;
 - Views of the Proposed Development being obscured for example by trees; and/or
 - The time of day at which the solar reflection will occur for example during peak traffic times.

- 5.313. The factors in Table 38 will be used to ascertain the possible significance for each view and the factors listed above will then be taken into consideration to determine the overall significance for the designated viewpoint.

Table 29 Solar Glare Criteria

Scale of Effect	Possible factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance".
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time.
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.
Major	Solar reflections are visible within 5° of a driver's line of sight.

- 5.314. Effects classified as Moderate or Major in scale are considered to be 'significant'. Effects classified as Minor or Negligible in scale are considered to be 'not significant'.

- 5.315. All viewpoints assessed for solar glare are considered to be of high sensitivity.

Source of Effect

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

Baseline Conditions

- 5.317. The solar glare assessment is undertaken on the worst-case scenario. Solar Glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Proposed Development. Therefore, the assessment considers the effect of the Proposed Development in absolute terms.
- 5.318. However, it should be noted that the Proposed Development will be located on a Site where its existing state is a low-rise building, an industrial building with few windows and construction compound, thus there is limited opportunity for instances of solar glare from the EIA Site to be experienced. Solar glare from surrounding buildings is not assessed.

Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Solar Glare impacting visibility of road users at selected viewpoints within 500m of the EIA Site where the Proposed Development is visible	Safety issues concerning transit through critical intersections and junctions	Visibility of traffic lights, intersections and pedestrian crossings could be obscured by instances of glare, potentially resulting in traffic accidents	C/O	In
Solar Glare impacting visibility of tram drivers at selected viewpoints within 500m of the EIA Site where the Proposed Development is visible	Safety issues concerning visibility of train drivers along nearby railway tracks	Visibility of signals along the tracks could be obscured by instances of glare, potentially resulting in accidents	C/O	In

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Solar Glare impacting occupants of adjoining buildings	Visual discomfort concerning occupiers of adjoining buildings	Significant durations, greater than 50 hours per year, of reflected sunlight that would result in discomfort to occupiers of adjoining buildings	N/A	Out

Townscape and Visual Impact Assessment

Introduction

- 5.319. This Chapter of the ES will be prepared by Chris Burnett and assesses the likely Townscape and Visual impacts of the Proposed Development upon the EIA Site and surrounding area. This Chapter will also describe the methods used to assess these impacts, the existing baseline conditions, mitigation measures and the likely residual impacts after these methods have been adopted.
- 5.320. The author, Chris Burnett BSc;BLD;CMLI, of this input has experience of preparing over 40 Tall Building assessments as part of EIAs.

Assumptions and Limitations

- 5.321. Views will be assessed in the winter months when foliage is at its least. In terms of visibility therefore this represents a worst case scenario in certain views. Wherever possible views will be sought which exclude foliage.

Legislative and Policy Context

- 5.322. Relevant Legislation and policies are set out in the European Landscape Convention, National Planning Policy Framework and MCC's Core Strategy

Legislation

- 5.323. The European Landscape Convention (ELC, 2000)⁵⁰ 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.

National Planning Policy and Guidance

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

Sub-Regional Planning Policy and Guidance

- 5.325. None relevant.

Local Planning Policy and Guidance

- 5.326. The following relevant policies will be referenced in the TVIA chapter from MCC's Core: Policy EN 1 Design Principles and Strategic Character Area; Policy CC6 High Density Development; Policy CC9 Design and Heritage; Policy EN2 Tall Buildings.

Consultation

- 5.327. Agreement will be sought from MCC regarding Visualisation Methodology (see Appendix S1 which accompanies this Scoping Report) and also the selected Representative Viewpoints once they have been selected as part of the TVIA.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.328. The following scenario will be tested:
- Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + cumulative as this represents the worst case scenario.

⁵⁰ Ref 9.1 The European Landscape Convention (ELC 2000)

- 5.329. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to Townscape and Visual Impact discipline and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Townscape and Visual Impact discipline will be testing the development as a whole.

The Study Area

- 5.330. The study area is proposed to be set at a distance of 1.0km around the EIA Site, beyond which it is not considered that effects on townscape character or visual amenity will be likely to result from the Proposed Development. This is in line with GLVIA (paragraphs 5.2 and 6.2).

Baseline Surveys and Assessment

- 5.331. Townscape and visual impacts can arise from the addition of, or changes to, physical features in the townscape and views, which affect its character. The visual impact assessment addresses the impacts of the Proposed Development, in this case the development of Plot D and Crown Street Phase 3, on the current baseline, in terms of views within the study area of Manchester City Centre as defined by the selection of the Representative Viewpoints.
- 5.332. The assessment of townscape impacts will be structured around the identification of distinct blocks of townscape, or character areas, defined through homogeneity of scale, materials, land use, heritage, street pattern, open space, amongst other factors as they exist in 2022

Significant Criteria Effects

- 5.333. The Institute of Environmental Management and Assessment (IEMA) / Landscape Institute 'Guidelines for Landscape and Visual Impact Assessment' (3rd Ed., 2013) will be used as the principal source of guidance for the methodology for this assessment. The Historic England Advice Note (no.4) on Tall Buildings, will also be used as relevant guidance. A Zone of Theoretical Visibility (ZTV) map will be produced using Lidar data superimposed onto a 10K map to provide an indication of the Proposed Developments' visibility and guide the selection of viewpoints.
- 5.334. A number of 'representative viewpoints' will then be selected, all within the identified Zone of Visual Impact and ZTV identified above, will be confirmed following extensive fieldwork. This will inform the assessment of the effect of the Proposed Development on townscape character, views and visual receptors in more detail and on a comprehensive basis, taking in short, medium and long range views from publicly accessible viewpoints. Receptors fall into two categories: Townscape Receptors and Visual Receptors.

Townscape: Sensitivity of Receptor and magnitude of change

- 5.335. The sensitivity of a townscape receptor is an expression of its ability to accommodate the Proposed Development. Sensitivity is a judgement based on a combination of the susceptibility of the type of change or development proposed and the value attached to the townscape. 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). Susceptibility is evaluated for each receptor type. 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 townscape value.
- 5.336. 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.

Visual: Sensitivity of receptor and magnitude of change

- 5.337. 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
- 5.338. The value attached to views has regard to a number of factors, including:
- Recognition through planning designations or heritage assets; and

- The popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

5.339. 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.

5.340. 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. 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.

Significance of effect

5.341. The objective of the assessment process would be to identify and evaluate the likely significant effects arising from the Proposed Development. Significance indicates the importance or gravity of the effect. Whilst there would be a degree of professional judgement involved in determining the significance of townscape and visual effects, they can broadly be determined by the interaction of the sensitivity of the receptor and the magnitude of change. Significance of effect values which are considered to be moderate and above are judged to be significant in EA regulation terms.

5.342. The Townscape and Visual Impact Assessment will be supported by Visualization Type 4, the most sophisticated type of visualization and Level 0 (Wirelined) and Level 3 (Fully Rendered) Accurate Visual Representations (AVRs) consisting of images of the Proposed Development superimposed onto baseline photographs which are accurately surveyed from selected viewpoints. The Landscape Institute's latest Advice Note 06/19 will be used to inform the methods for production of all visualisations. (see Appendix S1).

5.343. The assessment will be based on an assessment of the baseline townscape character in 2022. It will also assess the effects of demolition and construction of the Proposed Development and of the Proposed Development on completion.

Source of Effect

5.344. Sources of effect can be derived from the addition of new elements or features that will influence the character and distinctiveness of the townscape during construction and on completion and the addition of new elements or features that will influence the view and visual receptors from selected Representative Viewpoints during construction and on completion.

Baseline Conditions

5.345. The EIA Site will consist of 2 EIA Sites Plot D and Crown Street Phase 3 which will be the subject of 2 separate Planning applications but a single EIA. The EIA Sites are described in Section 2 of this Report.

Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Townscape character	Townscape impacts	Addition of new elements or features that will influence the character and distinctiveness of the surrounding townscape	C and O	In
Visual Receptors	Visual impacts on people	Effects on receptors who are most sensitive and least sensitive to changes in the view dependent on category of receptor	C and O	In

5.346. For completeness, the following Committed Developments are considered relevant and included in the assessment: The following committed schemes will be assessed for Cumulative Effects:

- Plot H Gt Jackson St
- Hotspur Press

- Plot 11 First St
- Plot G Gt Jackson St
- 2-4 Whitworth St
- Plot F Gt Jackson St
- Arundel St
- One Medlock St
- City Road
- Viadux

Traffic and Transport

Introduction

- 5.347. This Chapter of the ES will be prepared by Curtins and assess the likely traffic and transport impacts of the Proposed Development upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.348. The author of this Chapter – Carl Peers of Curtins – has relevant experience in preparing Traffic and Transport Chapters for EIA developments. Carl is a Business Unit Director at Curtins responsible for the northern transport planning teams in England. He has over 17 years’ experience in development planning, managing projects at all stages of the planning process from initial development feasibility to detailed planning submission and the discharge of planning conditions. He prepares Transport Assessments, Travel Plans and transport chapters of ES reports as part of the EIA process.
- 5.349. Carl has a wide range of development planning experience across a variety of land uses, including residential, employment, and mixed-use EIA Sites that have involved an EIA. Carl also has considerable residential experience having worked on schemes from tens to thousands of units. He is conversant with transport planning guidance and policy, including those related to the EIA process, and he provides advice on a wide range of transport and highways matters. Carl has an MSc in Transport Planning & Practice, is a Chartered Member of the Institute of Logistics and Transport, and a Member of the Chartered Institution of Highways and Transportation.

Assumptions and Limitations

- 5.350. Junction capacity assessments will be undertaken using the industry-standard junction modelling software packages JUNCTIONS and LinSig. Further details will be provided within the accompanying Transport Assessment (TA) – to be appended to the ES. There are various inputs to these models, such as geometric measurements and traffic data, as well as assumptions about driver behaviour. However, when used correctly, these programs provide an accurate reflection of junction capacities, queueing and delay.
- 5.351. Annual Average Daily Traffic (AADT) flow factors will be calculated from peak hour flows. There are both limitations and assumptions associated with factoring traffic counts from peak hours to 24-hour AADT flows. Notwithstanding, this is common practice, and the factors provide a means of deriving and comparing daily traffic flows in the study area.

Legislative and Policy Context

- 5.352. Relevant sections of the following key transport policy documents are to be taken account in the preparation of the Traffic and Transport Chapter of the ES:
- National Planning Policy Framework (MHCLG, 2021);
 - Planning Practice Guidance (DLUHC/MHCLG, 2014);
 - Manchester Core Strategy (2012 – 2027) (MCC, 2012); and
 - Greater Manchester Transport Strategy 2040 (TfGM, 2021).
- 5.353. Additionally, the key guidance documents that are relevant to the assessment are set out below:
- Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993);
 - Guidelines for Providing for Journeys on Foot (CIHT, 2000);
 - The National Model Design Code (DLUHC/MHCLG, 2021);

- Buses in Urban Developments (CIHT, 2018);
- Manual for Streets 1 & 2 (DfT, 2007 and CIHT, 2010 respectively);
- Design Manual for Roads and Bridges (NH, Various Dates); and
- Transport Analysis Guidance (TAG) (DfT, Various Dates).

Consultation

- 5.354. The scope of the TA, including the study area and scenarios for assessment, has been discussed with MCC and Transport for Greater Manchester, with the first scoping meeting held on 14th October 2022.
- 5.355. The study area, scenarios for assessment and traffic data sources for the Traffic and Transport chapter of the ES will be based on the TA. The traffic data is proposed to be based on 2022 traffic surveys, or other recent surveys. At the time of issue, Curtins is awaiting confirmation of the TA scope.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.356. 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.
- 5.357. The Proposed Development will be phased as follows, with broad arrangements as per the bullets below, which is correct at time of issue:
- Phase 1: Plot D2 Office;
 - Phase 2: Crown Street Phase 3 Plot E2;
 - Phase 3: Crown Street Phase 3 Plot E1;
 - Phase 4: Crown Street Phase 3 Plot C8;
 - Phase 5: Crown Street Phase 3 Plot C7; and
 - Phase 6: Plot D1 Residential Tower.
- 5.358. Based on the phased approach to the Proposed Development, the following scenarios are proposed to be assessed within this ES Chapter, which considers the worst-case scenarios:
- Scenario 1: Baseline (including all Committed and Cumulative Development traffic flows); and
 - Scenario 7: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6.
- Note: the proposed scenarios for assessment are the two worst case scenarios. The list of committed developments provided are all planning applications, therefore the committed development and cumulative scenarios will be the same in traffic and transport terms.*
- 5.359. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of 'Phase 1 Plot D2 Office Building' was to come later in the programme. We have considered this with regard to Traffic and Transport discipline and changes to the sequencing of 'Phase 1 Plot D2 Office Building' would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that Traffic and Transport discipline will be testing the development as a whole.

The Study Area

- 5.360. The extent of the study area will be defined using a combination of IEMA Guidelines and the extent of the network being considered as part of the TA. Locations on the highway network surrounding the EIA Site will be 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 EIA Site.

Baseline Surveys and Assessment

- 5.361. Traffic data from surveys undertaken in 2022, or other recent surveys, will be utilised for the agreed study area to inform the baseline conditions. The development flows will be derived from the TA.
- 5.362. A Committed Development schedule has been prepared to inform the flows to be combined with the 2022 traffic surveys to create a Baseline position. Only those developments that will have a material impact in the study area will be included in the assessment.
- 5.363. The Committed Developments to be considered within the Baseline scenario are included in Appendix 2.

Significant Criteria Effects

- 5.364. The environmental impacts of traffic generated by the Proposed Development will be 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.
- 5.365. These thresholds will be 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 will be required. The Proposed Development are unlikely to generate hazardous loads, therefore the consideration of hazardous loads has been scoped out.
- 5.366. 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).
- 5.367. Receptors will comprise pedestrians, cyclists, public transport users and drivers affected by the impacts of traffic generated by the Proposed Development.
- 5.368. The sensitivity of each receptor in the study area will be defined on the following scale, with reference to the IEMA Guidelines and the local context of each receptor:
- High;
 - Medium; and
 - Low.
- 5.369. The magnitude of change (impact) resulting from the Proposed Development, will be assessed using the following scale, based on the assessments contained within the TA and with consideration to relevant guidance:
- Major;
 - Moderate;
 - Minor; and
 - Negligible.
- 5.370. Determining the classification of effects will be undertaken using professional judgement that underpin the attribution of significance. Each effect will be assessed against the sensitivity of the receptor and the magnitude of change, as shown in Table 39 below. Where more than one effect classification exists for any given scenario (e.g. minor or moderate), professional judgement will be used to assign a single effect classification.

Table 30 Matrix for Classifying Effects

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

- 5.371. In accordance with EIA Regulations, the likely environmental effects of the Proposed Development will be identified and their significance determined. Evaluation of their significance will be based upon specific criteria for each type of receptor and impact. This process will consider the following:
- Impact likelihood, extent and magnitude;
 - Impact nature (whether beneficial or adverse, direct or indirect, primary or secondary, permanent or temporary);
 - Importance and sensitivity of the environmental receptor;
 - The number of receptors that are impacted;
 - Impact duration (whether short, medium or long term); and
 - Whether it is a stand-alone impact or cumulative.
- 5.372. Effects that are classified as moderate or above are considered to be significant. Effects classified as below moderate are considered to be not significant.

Baseline Conditions

- 5.373. The baseline conditions that the Proposed Development will be assessed against consist of a range of different receptors. These include pedestrians, cyclists, public transport users and drivers of private and commercial motorised vehicles.
- 5.374. In order to gain an understanding of the baseline traffic conditions, traffic data will be utilised for the agreed study area. Additionally, road traffic collision data for the most recent five-year period available will be obtained and reviewed.
- 5.375. The EIA Site is described in Section 2 of this report. The EIA Site has a Greater Manchester Accessibility Levels rating of 8, where level 8 represents a high level of accessibility (described as 'excellent') by Transport for Greater Manchester.
- 5.376. The EIA Site is located in a key strategic location to the south of the City Centre, being within a ten-minute walk of the transport hubs of Deansgate train station and Deansgate-Castlefield Metrolink stop. The EIA Site is within walking distance of two key transport hubs at Manchester Oxford Road Station and Piccadilly Station both of which offer local, regional, and national main line rail connections. Both stations also provide direct access to Manchester Airport. The closest Metrolink stop to the EIA Site is c. 480m away at Deansgate-Castlefield, but the regional Metrolink network can also be accessed from Manchester Piccadilly or St Peter's Square Metrolink stops, located c. 1.7km and c. 1.1km from the EIA Site respectively.
- 5.377. The EIA Site is therefore 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 provide viable alternatives to travel by car.

Potentially Significant Effects

- 5.378. [Table 31](#) below summarises the traffic and transportation impacts and potential effects to be assessed in the ES Chapter:

Table 31 Matrix for Classifying Effects

Receptor	Potential Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Pedestrian and Cyclists on the Local Highway Network within the Study Area	Pedestrian Delay Pedestrian Amenity Severance Collisions and Road Delay	Construction activities have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on pedestrians and cyclists.	C	In
Public Transport Users on the Local Highway Network within the Study Area	Driver Delay Collisions and Road Safety	Construction activities have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on public transport users.	C	In
Drivers on the Local Highway Network within the Study Area	Driver Delay Collisions and Road Safety	Construction activities have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on drivers.	C	In
Pedestrian and Cyclists on the Local Highway Network within the Study Area	Pedestrian Delay Pedestrian Amenity Severance Collisions and Road Delay	Once operational, the Proposed Development may have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on pedestrians and cyclists.	O	In
Public Transport Users on the Local Highway Network within the Study Area	Driver Delay Collisions and Road Safety	Once operational, the Proposed Development may have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on public transport users.	O	In
Drivers on the Local Highway Network within the Study Area	Driver Delay Collisions and Road Safety	Once operational, the Proposed Development may have the potential to change traffic flows, traffic speeds and traffic composition, which may impact on drivers.	O	In

5.379. The EIA will identify any mitigation measures necessary to address any significant effects during the construction and operational phases of the Proposed Development.

Wind Microclimate

Introduction

- 5.380. This Chapter of the ES will be prepared by WSP UK Ltd. and assesses the likely wind microclimate impacts of the proposals upon the EIA Site and surrounding area. This Chapter will also describe 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.
- 5.381. The authors of this Chapter are Stefano Cammelli (Director – Head of Wind Engineering at WSP) and Elvin Hii (Associate – Wind Engineering at WSP). Stefano is a wind engineering specialist with 20 years' experience in the provision of wind engineering consultancy services. He has an active professional involvement in the global wind engineering community through participation in committees, working groups and peer reviews and he is also a regular presenter at international conferences, with more than 50 publications in technical and industry journals. Stefano is a Fellow of the Institute of Civil Engineers and the current Chairman of the UK Wind Engineering Society. Elvin is a wind engineering specialist with 8 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 a Member of the Institution of Mechanical Engineers and a Member of the UK Wind Engineering Society.

Assumptions and Limitations

- 5.382. The following assumptions and limitations have been made when completing this scoping report:
- The models and calculations for the wind assessment will be 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 – which will be used in the wind microclimate assessment – 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
 - Conservatively, off-EIA Site cumulative landscaping schemes will not be explicitly modelled in the CFD simulations
 - The wind study will focus on pedestrian level wind environment and excludes façade pressure, wind loads, inputs to structural engineering; internal airflows within buildings or impacts on vehicles or waterways.

Legislative and Policy Context

Legislation

- 5.383. There is no specific national legislation or planning policy guidance dealing with wind microclimate in terms of pedestrian comfort. However, the LDDC version of the Lawson criteria are typically used to benchmark the performance of new developments in the context of pedestrian level winds.

National Planning Policy and Guidance

- 5.384. The National Planning Policy Framework was re-issued in February 2019 by the Ministry of Housing, Communities and Local Government. The relevant paragraphs are as follows. Paragraph 127 of the National Planning Policy Framework states that:

"Planning policies and decisions should ensure that developments:

- a) will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;*
- b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;*
- c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);*
- d) establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;*

- e) *optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and*
- f) *create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.”*

Local Planning Policy and Guidance

5.385. Manchester's Local Development Framework – Core Strategy Development Plan was adopted by MCC 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.

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.”

Paragraph 12.14 of the Policy EN 2 on Tall Buildings states that:

“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.”

Consultation

5.386. To our knowledge, no consultation has been undertaken with the MCC directly in relation to wind microclimate.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.387. The assessment of the wind microclimate impacts comprises the following eight (8) scenarios:
1. Scenario 1: Baseline (existing site in existing surrounds). I assume this also includes projects under construction
 2. Scenario 3: Baseline + Phase 1 + Phase 2 in existing surrounds (including projects under construction).
 3. Scenario 4: Baseline + Phase 1 + Phase 2 + Phase 3 in existing surrounds (including projects under construction).
 4. Scenario 5: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 in existing surrounds (including projects under construction).
 5. Scenario 6: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 in existing surrounds (including projects under construction).
 6. Scenario 12: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Cumulative As per Scenario 5 but with the inclusion of consented schemes (but with the exclusion of Phase 6).
 7. Scenario 7: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 in existing surrounds (including projects under construction).
 8. Scenario 13: Baseline + Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + Cumulative As per Scenario 7 but with the inclusion of consented schemes

The Study Area

5.388. The study area for the Wind Microclimate assessment will include all buildings (existing/under construction/consented, depending on the configuration of interest) within 500m from the EIA Site.

Technical Scope

5.389. A quantitative assessment of the existing wind environment at the EIA Site will be used to establish the 'Baseline' scenario. This will be followed by a quantitative assessment of the Proposed Development modelled within the existing surroundings. A further quantitative assessment of the Proposed Development will include the consented developments to determine the cumulative effects.

- 5.390. 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.
- 5.391. 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 (e.g. the “Wind Microclimate Guidelines” published by the City of London in 2019).
- 5.392. A quantitative assessment of the existing wind environment at the EIA Site will be used to establish the ‘Baseline’ scenario. This will be followed by a quantitative assessment of the Proposed Development modelled within the existing surroundings. A further quantitative assessment of the Proposed Development will include the consented developments to determine the cumulative effects.
- 5.393. The CFD simulations will be used to quantify the local wind speeds within and in the vicinity of the EIA Site of the Proposed Development at street level and, if required, at elevated levels (e.g. balconies and terraces) for a comprehensive range of wind directions.
- 5.394. Long-term wind records from Manchester Airport will be used to develop an EIA Site-specific wind climate model. In order to account for the differences in terrain surrounding the weather station at Manchester Airport and the project EIA Site, adjustments to the wind records will be made using the wind model proposed by ESDU, an engineering advisory organisation based in the UK
- 5.395. The local wind speeds obtained from the CFD simulations will then be combined with the EIA Site-specific wind climate model to determine the probability of exceedance of pre-defined wind speed thresholds.
- 5.396. In order to assess the suitability of wind conditions within and in the vicinity of the EIA Site of the Proposed Development, the LDDC version of the Lawson criteria - which associates the probability of exceedance of wind speed thresholds to a range of pedestrian activities - will be used.

Baseline Surveys and Assessment

- 5.397. The baseline assessment will be carried out as a representation of the existing EIA Site conditions, i.e., the existing building(s) on the EIA Site in the context of the existing surroundings. Any buildings under construction within 500m from the EIA Site will be considered as completed as part of the baseline assessment, unless instructed otherwise by the planning/EIA team. This includes the following schemes:
- Deansgate Square – 111719/FO/2016/C1
 - Crown Street Phase 2 (excluding school) – 126668/FO/2020
 - Viadux – 126868/JO/2020
 - Plot 9 First Street – 132600/FO/2021
 - 10-12 Whitworth Street – 111003/FO/2016/C1
- 5.398. Any schemes with planning consent (for which construction has not commenced) or are subject to planning consent and are within 500m from the EIA Site will be considered as part of the cumulative assessment, unless instructed otherwise by the planning/EIA team. This includes the following schemes:
- Plot H, Great Jackson Street Framework – 129406/FO/2021
 - 1 Alpha Place – 120113/FO/2018
 - 325 Deansgate – 125804/FO/2019
 - Plot 11, First Street – 125573/FO/2019
 - One City Road – 128002/FO/2020
 - Plot G, 34 Great Jackson Street – 129273/FO/2021
 - 2-4 Whitworth Street – 126308/FO/2020
 - Bridgewater House Great Jackson Street – 134694/FO/2022
 - Plot F Great Jackson Street – 132199/FO/2021
 - One Medlock Street – 13419/FO/2022

- Crown Street Phase 2 (including school)– 126668/FO/2020*
- Arundel Street – 123261/FO/2019*

**The CFD analysis was set up prior to works starting on site on Crown Street Phase 2 and Arundel Street these are therefore included in the cumulative assessment for the purpose of the wind assessment.*

Significant Criteria Effects

- 5.399. The Lawson Criteria stipulates that for the comfort and safety assessment of wind effects, it is not only the velocity of wind that is considered but also the frequency of occurrence of these velocities. The frequency of occurrence is used as an indicator of the likely duration of wind speeds. The criteria provide ranges of acceptability to maintain pedestrian comfort for different activities and relate frequency of occurrence to the hourly average wind speed ranges. The criteria ranges for the comfort assessment are set out in the table below.

Table 41 Summary of Comfort Assessment

Comfort Category	Speeds not to be exceeded by more than 5% of the time	Description
Sitting	4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods.
Pedestrian Standing	6 m/s	Gentle breezes suitable for main building entrances, pick-up/drop-off points and bus stops.
Pedestrian Leisure Walking	8 m/s	Moderate breezes that would be appropriate for strolling along a city/town centre street, plaza or park.
Business Walking	10 m/s	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering.
Uncomfortable	>10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

- 5.400. The Lawson method also identifies a safety criterion to identify those areas where someone could find walking difficult, or even stumble and fall. The Lawson criteria define threshold wind speeds not to be exceeded for more than 0.025% of the year. The safety criterion is set out in the table below.

Table 42 Summary of Safety Criterion

Safety Rating	Threshold Mean-hourly Wind Speed Exceeded Once Per Annum (0.025%)	Potential effects	Development Constraints
S15 - Unsuitable for the general public	>15 m/s	Less able and cyclists find conditions physically difficult.	S15 threshold not to be exceeded in areas accessible to the general public: sitting areas, standing areas, leisure walking areas. Mitigation required
S20 - Unsuitable for able-bodied	>20 m/s	Able-bodied persons find conditions difficult. Physically impossible to remain standing during gusts.	Threshold not to be exceeded in areas with limited public access, e.g. maintenance areas and carparks.

- 5.401. As the Lawson criteria was specifically derived for pedestrian activities, this assessment will only concentrate on assessing areas accessible to pedestrians.

- 5.402. A detailed review and assessment of the risk associated with wind-induced overturning moments of high-sided vehicles will not be covered by this assessment. Whilst the various mechanisms around wind-induced overturning moments of high-sided vehicles are well-understood in the context of large road bridges, at present there are no guidelines in the UK specifying how an assessment of such risk should be derived in the context of an urban setting.
- 5.403. To determine the significance of the effect of the Proposed Development on the wind environment, a comparison can be made with the baseline conditions. However, because the pedestrian use of the Proposed Development will change from that of the existing EIA Site, the assessment will also be based on the suitability of the different areas of the Proposed Development for the desired pedestrian use. The likely significance of effects will be based on the following factors:
- The magnitude of change of the wind environment.
 - Compliance with the Lawson criteria.
 - The sensitivity of the receptor.
- 5.404. The following sensitive receptor locations have been identified and will be considered within the EIA:
- High Sensitivity: areas intended for sitting and standing (e.g., benches, restaurants and bars, building entrances).
 - Medium Sensitivity: areas intended for leisure walking (i.e., commercial or residential streets).
 - Low or Negligible Sensitivity: areas intended for business walking (e.g., streets leading to back-of-the-house or maintenance entrances, areas intended for car parks and high-speed roads) and roof-tops only accessible for maintenance.
- 5.405. The magnitude of impact will be categorised as major, moderate, or negligible using professional judgement based on the change in velocity observed from the 'Baseline Scenario'. The criteria for determining the magnitude of impact for the pedestrian comfort and safety assessments are summarised in the tables below.

Tables 43 and 44 Summary of Criteria for Determining the Magnitude of Impact for Pedestrian Comfort and Safety Assessments

Change in Lawson Comfort Criteria Category	Suitable for Intended Use	Unsuitable for Intended Use
Wind Conditions increase/decrease by ≥ 1 category	Negligible / Moderate	Major
Wind Conditions remain within the same comfort category	Negligible	Negligible

Change in Lawson Safety Criteria Category	Suitable for all pedestrians	Unsuitable for general public (S15)	Unsuitable for all pedestrians (S20)
Wind conditions remain within same safety category	Negligible	Negligible	Negligible
Wind conditions increase/decrease to a new safety category	Major	Moderate / Major	Major

- 5.406. The wind microclimate conditions of the new receptors created as part of the Proposed Development will be assessed on the basis of their level of adherence to the 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 baseline. The criteria for determining the impact of the proposed Development on the new receptors both for pedestrian comfort and safety within the EIA Site are listed in the tables below.

Table 45 and 46 Criteria for Determining Impact of Proposed Development on the New Receptors both for Pedestrian Comfort and Safety within the EIA Site

Lawson Comfort Criteria Category	Suitable for Intended Use	Unsuitable for Intended Use
Wind conditions are ≥ 1 category windier/calmer than desired	Negligible / Moderate	Moderate

Wind conditions within desired category	Negligible	N/A
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Lawson Safety Criteria Category	Suitable for all pedestrians	Unsuitable for general public (S15)	Unsuitable for all pedestrians (S20)
Wind conditions at new receptor	Negligible	Major	Major

- 5.407. Where the result of the assessment identifies areas at which the recommended standards are not met or where the suitability exceeds that of the intended use, wind mitigation measures will be introduced in order to achieve the required level of safety and / or comfort and / or limit the adverse effect of the Proposed Development and an assessment of the residual effects made.

Source of Effect

- 5.408. Both buildings and terrain upstream of the Proposed Development can affect the local speed and direction of the wind flow. In the absence of non-synoptic wind events (e.g., thunderstorms), the strength of wind speed typically increases with height. In an urban context, wind speeds at pedestrian level are therefore generally low compared to that of upper-level winds. However, taller buildings can alter this: downdrafts from tall buildings are in fact well known for increasing the level of windiness at street level. Localised aerodynamic phenomenon such as corner accelerations and funnelling of winds can also result in windier conditions. Conversely, calmer wind conditions can also occur because of beneficial shielding effects.

Baseline Conditions

- 5.409. Urban density of the area surrounding the EIA Site of the Proposed Development will affect the wind conditions within and in the vicinity of the Proposed Development itself. The surrounding context and the nature of the terrain upstream of the EIA Site do in fact influence the strength, the level of turbulence as well as the local directionality of the winds that are approaching the EIA Site of the Proposed Development. For this reason, modelling and studying these conditions is an important step of the wind microclimate assessment. The baseline assessment will be carried out as a representation of the existing EIA Site conditions, i.e. the existing building(s) on the EIA Site (if any) in the context of the existing surroundings. Any buildings under construction within 500m from the EIA Site will be considered as completed as part of the baseline assessment, unless instructed otherwise by the planning/EIA team. The baseline assessment will then be used as a reference point from which the magnitude of change will be measured once the Proposed Development is assessed under equal conditions.

Potentially Significant Effects

Table 47 Summary of Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Pedestrians around the EIA Site	Temporary effects on pedestrians due to temporary changes in the local wind environment during the phased construction of the Proposed Development	Tall buildings can affect the local speed and direction of the wind flow. In particular, downdrafts from tall buildings are well known for increasing the level of windiness at street level during the construction of the Proposed Development.	C	In
Pedestrians and users of external spaces within the EIA Site and the surrounding area	Long-terms effects on the relative pedestrian and user comfort on completion of the Proposed Development	Tall buildings can affect the local speed and direction of the wind flow. In particular, downdrafts from tall buildings are well known for increasing the level of windiness at street level with possible implications on the comfort of pedestrians and users on completion of the Proposed Development.	O	In

Pedestrians and users of external spaces within the EIA Site and the surrounding area	Long-term effects on pedestrian and user safety on completion of the Proposed Development	Tall buildings can affect the local speed and direction of the wind flow. In particular, downdrafts from tall buildings are well known for increasing the level of windiness at street level with possible implications on the safety of pedestrians and users on completion of the Proposed Development.	O	In
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5.410. For completeness, the following Committed Developments are considered relevant and included in the assessment:

Table 47 Summary of Potentially Significant Effects

ID	Name	LPA Planning Ref.	Distance from EIA Site	Status	Scoped In / Out
1	Deansgate Square	111719/FO/2016/C1	85 m	BASELINE Complete, although not all approved landscaping has been delivered.	In
2	Crown Street Phase 2 (including school)	126668/FO/2020	100 m	BASELINE Under construction.	In
3	Viadux	126868/JO/2020	476 m	BASELINE Above ground works have commenced albeit construction has not progressed beyond the podium level.	In
4	Plot 9 First Street	132600/FO/2021	430 m	BASELINE Above ground works have commenced, with construction expected to commence within the next couple of weeks.	In
5	10-12 Whitworth Street	111003/FO/2016/C1	360 m	BASELINE Planning Permission implemented, not under construction. EIA Site has been cleared.	In
6	Trinity Islands	132429/FO/2021	696 m	BASELINE Approved – 13th May 2022. Works started on EIA Site.	Out
7	Arundel Street	123261/FO/2019	425m	BASLEINE Enabling works underway. Start date TBC.	In
8	Plot H, Great Jackson Street Framework	129406/FO/2021	132 m	CUMULATIVE Planning Permission approved 17/05/2022, not under construction and no conditions discharged.	In
9	1 Alpha Place	120113/FO/2018	449 m	CUMULATIVE Planning permission not implemented, not under construction.	In

ID	Name	LPA Planning Ref.	Distance from EIA Site	Status	Scoped In / Out
				Discharge of Condition application submitted in August 2021 shows as pending neither approved nor dismissed on Council website.	
10	325 Deansgate	125804/FO/2019	326 m	CUMULATIVE Planning permission not implemented, not on EIA Site.	In
11	Hotspur Press	120635/FO/2018	540 m	CUMULATIVE Located just outside of buffer zone. Planning permission not implemented, not on EIA Site.	Out
12	Plot 11 First Street ⁵¹	125573/FO/2019	436 m	CUMULATIVE Planning permission not implemented, not on EIA Site.	In
13	One City Road	128002/FO/2020	302 m	CUMULATIVE Planning Permission not implemented, not under construction	In
14	Plot G, 34 Great Jackson Street	129273/FO/2021	130 m	CUMULATIVE Live planning application in SRF area, which may be approved prior to submission of Proposed Development, not under construction	In
15	2-4 Whitworth Street	126308/FO/2020	336 m	CUMULATIVE Planning Permission not implemented, not under construction	In
16	Bridgewater House Great Jackson Street	134694/FO/2022	95 m	Application in SRF Area. Pending decision (validated on 24th August 2022)	In
17	Plot F Great Jackson Street	132199/FO/2021	114 m	CUMULATIVE Approved – 1st July 2022	In
18	One Medlock Street	13419/FO/2022	220m	CUMULATIVE Validated Validated - 29th November 2022	In
19	Plot 10 First Street ⁵²	N/A – not yet submitted	390m	CUMULATIVE	In

Socio-economics

Introduction

5.411. This Chapter of the ES will be prepared by ekosgen and assesses the likely socio-economic impacts of the proposals upon the site and surrounding area. This Chapter will also describe 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.

⁵¹ The committed developments were agreed with Manchester City Council in November 2022 and consultants have based their EIA assessments on this basis. Since then, we have been made aware that Plot 11, First Street has started on-site, all consultants will therefore consider whether Plot 11 First Street being in the baseline will have any impact on their conclusions.

⁵² Since agreement with Manchester City Council in November 2022, this planning application has now been submitted and validated

- 5.412. Ekosgen has a wealth of experience in undertaking/preparing socio-economic assessments as part of EIAs for proposed developments. The authors of the socio-economics input are Richard Weaver, Ross Mawhinney and Will Christiansen. Richard holds a BA (Hons) and PhD in Human Geography; he has 17 years' experience in economic development as a whole, and nine years' experience in undertaking a range of socio-economic assessments. Ross holds a BA (Hons) in Politics, Philosophy and Economics, and an MSc. In Leadership for Sustainable Development; he has four years' experience in economic development and undertaking socio-economic assessments and appraisals. Will holds a BSc Geography and an MSc Real Estate; he has almost six years' experience in economic development, and over four years' experience in preparing more than 25 EIA developments.

Assumptions and Limitations

- 5.413. There are no recognised criteria for the assessment of socio-economic impacts, and therefore ekosgen, drawing on their expertise, knowledge of overarching guidance and experience of working in the subject area, have taken a structured approach to quantifying and assessing the scale and nature of potential impacts relative to baseline conditions. In cases where impacts cannot be quantified, a qualitative judgement has been made, drawing on professional experience.
- 5.414. The most up to date data from official published sources has been used wherever possible; however, there are some limitations in the baseline data. Where this is the case, ekosgen have gathered data most closely aligning to the chosen Study Area and clearly stated what geography the data collected refers to.

Legislative and Policy Context

Legislation

- 5.415. There is no relevant legislation that relates specifically to the Socio-economics discipline.

National Planning Policy and Guidance

- 5.416. In July 2021, Government published a revised National Planning Policy Framework (NPPF). In order to achieve sustainable development, the NPPF sets out three interdependent overarching objectives: an economic, social and environmental objectives.
- 5.417. The economic objective is focused around building 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.”*
- 5.418. The NPPF recognises the need to *“ensure an integrated approach to considering the location of housing, economic uses and community facilities and services”*.

Sub-Regional Planning Policy and Guidance (where relevant)

- 5.419. The draft Places for Everyone Plan includes a 'brownfield preference' policy which has sought to enable most efficient use of brownfield land supply across Greater Manchester and *“maximise the supply of the brownfield land at the core of the conurbation and limit the need extent of Green Belt release”*.
- 5.420. The draft Places for Everyone Plan acknowledges that, while *“the City Centre will continue to provide the primary focus for business, retail, leisure, culture and tourism activity in Greater Manchester... the increasingly important residential role of the City Centre will be expanded considerably by a range of high density new homes, supported by necessary infrastructure.”*
- 5.421. The draft Places for Everyone Plan notes the importance that the *“growth potential of the Core Growth Area will continue through higher density development, building in opportunity areas, The Oxford Road Corridor, the existing office sectors, HS2 station proposals and improving the connections to other areas of Greater Manchester, which will assist growth within our boroughs”*.
- 5.422. As well as this, it recognises the need for *“maximising the reuse of previously-developed land and delivering higher densities in the most accessible locations will together help to reduce the total amount of land required for new buildings and hence minimise the need for development of greenfield sites”*.

Local Planning Policy and Guidance

- 5.423. The Manchester Core Strategy (2012) sets the overall strategic direction for planning for Manchester over the plan period from 2012 to 2027, and is in line with national policies. The policies of the Core Strategy establish where major development and other forms of investment should be located in order to be sustainable, meet local needs and take full advantage of opportunities. A key spatial principle of the Core Strategy is that the regional centre of Manchester will be the focus for economic and commercial development, retail, leisure and cultural activity, alongside high quality city living. In relation to the Proposed Development, relevant policies include:

- **Policy CC6** (City Centre High Density Development) sets out that City Centre development will generally be high-density to maximise land use efficiency.
- **Policy H1** (Overall Housing Provision) outlines the intentions to provide 60,000 new dwellings between March 2009 and March 2027, 16,500 of which are to be provided in the City Centre.
- **Policy H5** (Central Manchester) states that priority for residential developments will be provided for family housing and other high value, high quality development where this can be sustained.
- **Policy EN2** (Tall Buildings) sets out the permissible qualities for development of tall buildings, stating that they will be supported where it can be demonstrated that the buildings are of excellent design quality, appropriately located, contribute positively to sustainability and place making, and can bring significant regeneration benefits.
- **Policy EN11** (Quantity of Open Space, Sport and Recreation) establishes that MCC actively seek the provision of new open space, sport and recreation facilities, in particular where there is a quantitative shortage of use per head of population and where significant levels of development are proposed.

- 5.424. The Site sits within the Great Jackson Street Development Framework character zone –which was described in the original 2007 Development Framework as a *“new high-density quarter of Manchester with a vibrant and sustainable mix of uses, whose economic viability is driven by ‘knowledge capital’.”*
- 5.425. An update to the Great Jackson Street Development Framework in 2018 indicates that that the Crown Street (Plot C) Site will provide in excess of c.1800sqm of green park space for the benefit of new and existing residents and the wider public, including grassed lawns, high quality street paving and furniture, trees and planting.

Assessment Methodology and Significance Criteria

Scenarios To Be Tested

- 5.426. This chapter of the ES will assess all scenarios as set out in Section 4 of this Scoping Report.
- 5.427. The assessment is based on the phasing set out in the phasing and delivery section of this Report. We have been asked to consider whether there will be any different environmental impacts if the delivery of ‘Phase 1 Plot D2 Office Building’ was to come later in the programme. We have considered this with regard to socio-economic discipline and changes to the sequencing of ‘Phase 1 Plot D2 Office Building’ would not result in any different environmental impacts from those associated with the phasing as set out in the phasing and delivery section of the Report given that socio-economic discipline will be testing the development as a whole.

The Study Area

- 5.428. The approach to defining an appropriate study area has been informed by consideration of guidance on the topic 53. In respect of socio-economics, the relevant study area can vary according to different receptors; however, broadly, socio-economic impacts can be assessed with reference to a spectrum of spatial scales, ranging from the immediate local catchment through to the wider, sub-regional scale. The study area is also influenced by the availability of baseline data which may not always be available down to a local catchment area level.
- 5.429. In the case of the Proposed Development, the study area should reflect the Site’s anticipated immediate local catchment. This can be defined using Lower Super Output Areas (LSOA) and the Site sits within Manchester 060D. The wider study area is likely to comprise the LSOAs located within the southern portion of the Deansgate Ward (covering Manchester’s city centre) but bounded to the south by the Mancunian Way. This area reflects the city’s commercial core to the north as well as the Oxford Road Corridor, to the east of the Site, which is an innovation district with a mix of knowledge, business and cultural businesses. The wider, sub-regional study area reflects both the MCC area and the Greater Manchester City Region (comprising of the 10 Greater Manchester districts).
- 5.430. For some receptors a smaller study area may be required; for instance, with respect to the demand for social and community infrastructure within close proximity to the Proposed Development (i.e. within a certain distance radius from the Site).
- 5.431. Wherever possible, the baseline characteristics of the study area will be benchmarked against borough level (i.e. MCC) comparators as well as comparators at the sub-regional (Greater Manchester), regional and national level.

⁵³ English Partnerships (2008), Additionality Guide – A Standard Approach to Assessing the Additional Impacts of Interventions (Third Edition), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191511/Additionality_Guide_0.pdf

Baseline Surveys and Assessment

- 5.432. Baseline data have been derived from a range of publicly available secondary datasets, including (but not limited to) Annual Population Survey, Business Register and Employment Survey, the 2011 Census, and NHS General Practice workforce data. The most recent available data for the study area will be obtained, wherever possible.
- 5.433. All committed developments identified are relevant to this Chapter; however, due to data availability and time lags in reporting updates, it is unlikely that publicly available baseline data will reflect these committed developments.

Significant Criteria Effects

- 5.434. Since there are no specific technical criteria to assess the significance of socio-economic effects, assessment will take place in accordance with the overarching EIA methodology (Section 4) and will apply professional judgement informed by experience of similar projects. The overarching approach towards the assessment of the magnitude, sensitivity and overall significance of impacts is set out in Table 48 to Table 49 of this document.
- 5.435. The magnitude of socio-economic impacts will be assessed in line with the approach outlined in Table 48. In addition to the magnitude, the duration of impact will also be taken into account with the impacts ranging from those that are likely to be temporary or permanent.

Table 48 Methodology for Determining Impact Magnitude

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

- 5.436. The sensitivity of a receptor is based on the relative importance of the receptor using the framework outline in Table 49.

Table 49 Methodology for Determining Sensitivity

Sensitivity	Example of Receptor
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Moderate	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high importance.
Low	The receptor/resource is tolerant of change without detriment to its character, is of low or no local importance.

- 5.437. The significance of the impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The Impact Significance Matrix is set out in Table 50. All impacts assessed as 'moderate' or 'major' are considered to be 'significant' in EIA terms and denoted with an asterisk.

Table 50 Impact Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Substantial	Major *	Major *	Moderate *
Moderate	Major *	Moderate *	Minor
Minor	Moderate *	Minor	Negligible
Negligible	Minor	Negligible	Negligible

Baseline Conditions

- 5.438. The LSOA study area (Manchester 060D) was estimated to have a population of 2,318 in the ONS Mid-2020 population estimates⁵⁴ and is characterised by a substantially higher proportion of working age (16-64) residents (92%) compared to Greater Manchester (76%), the North West (78%), and national benchmarks (79%) for the same year.⁵⁵
- 5.439. In relation to employment structure, 32% of employment within the study area is within the 'Professional, scientific and technical' sector and is significantly overrepresented compared to the national average (9%). In combination with other sectors of the economy (such as 'Financial and insurance', 'Information and communication' and 'Administrative and support services') these account for 47% of employment across the study area. This compares to 27% of employment in the national average and 28% across Greater Manchester. This is reflective of the predominance of office-based, service economy activities within this part of the city centre. Other significant employment sectors within the study area are 'Accommodation and food services' (32% of employment) and 'Wholesale and retail trade' (7% of employment).⁵⁶
- 5.440. The Greater Manchester construction sector supports economic output (as measured in terms of Gross Value Added) of approximately £4.15 billion.⁵⁷ For every full time equivalent construction job this equates to an average GVA contribution of c.£85,000 per annum. This represents a higher average output compared to the all sector average for Greater Manchester (c.£67,000).⁵⁸ Average annual economic output per FTE is also higher than the all sector average for the following selected Greater Manchester sectors: 'Information and communication' (£86,000) 'Financial and insurance' (£144,000). The 'Professional, scientific and technical' sector is lower than the all sector average (£47,000).
- 5.441. The study area's claimant count (1.1%) is significantly lower than that of the benchmark areas of Manchester (5.7%), Greater Manchester (4.9%), the North West region (4.2%) and the English national average (3.7%).⁵⁹ Whilst data is not available at the study area level, Manchester's unemployment rate (9.0%) is higher than the benchmark areas of Greater Manchester, the North West region and the English national average. Manchester has a high proportion of people in employment (57%) within professional, managerial and technical occupations (SOCs 1-3) and has a higher proportion of residents qualified to NVQ 4+ level (45%) compared to benchmark areas. The proportion of residents with no formal qualifications (10%) is also higher in comparison to benchmark areas.⁶⁰
- 5.442. In terms of local educational provision, within a 1 mile walking distance of the Site there are 8 primary schools run by Manchester, Trafford and Salford local authorities. There are 8 secondary schools located within a 2 mile walking distance of the Site.⁶¹ The latest data indicate that there is surplus capacity in both primary (circa 7%) and secondary schools (circa 13%) considered within each respective radius. Based upon a 1,746-unit residential scheme of predominantly 1 and 2 bedroom apartments it is unlikely that this will yield a large number of primary or secondary-aged pupils. This is reinforced by a Salford City Council analysis of the average pupil yields from housing developments where the average primary pupil yield for apartments is 0.01⁶². If this is applied to the proposed homes then this would generate an additional demand of 17 primary aged pupils which could be easily accommodated by existing surplus capacity.
- 5.443. In terms of local service provision, there are 8 GP practices located within 1 mile of the Site.⁶³ According to latest available data, these are currently operating at an average of c.2,500 patients to every Full Time Equivalent GP ; however, the ratio for the practices closest to the Site (The Arch Medical Practice and Cornbrook Medical Practice) are operating at a lower ratio (c.1,500 and c.2,150 patients per FTE GP, respectively).⁶⁴ In terms of local dental service provision, there are 9 Dental practices located within 1 mile of the Site, the nearest of which is 207 Dental Care, located 0.5 miles away.⁶⁵

⁵⁴

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/lowersuperoutputareamidyearpopulationestimatesnationalstatistics>

⁵⁵ Nomis, 2022, Annual Population Survey, Economic Activity Rate July 2019-June 2020

⁵⁶ Nomis, 2022, Business Register and Employment Survey, Employee Count 2021

⁵⁷ ONS, 2022, Regional gross value added (balanced) by industry: all ITL regions, 2020 values

⁵⁸ Nomis, 2022, Business Register and Employment Survey

⁵⁹ Nomis, 2022, Claimant Count, October 2022

⁶⁰ Nomis, 2022, Annual Population Survey, Unemployment Rate, Percentage of all in employment who are SOC2020 1,2 and 3, Percentage with NVQ4+ and Percentage with no qualifications, January 2021-December 2021

⁶¹ UK Government, 2022, Get Information about Schools

⁶² Education Contributions Supplementary Planning Document: background document on primary pupil yield methodology and evidence base

⁶³ <https://www.nhs.uk/service-search/find-a-gp/results/M15%204AX>

⁶⁴ <https://digital.nhs.uk/data-and-information/publications/statistical/general-and-personal-medical-services/30-september-2022>

⁶⁵ <https://www.nhs.uk/service-search/find-a-dentist/results/M15%204AX>

- 5.444. The nearest leisure centre to the site is Sugden Sports Centre, less than a 20-minute walk away. There a number of other recreational sites within walking distance of the site, including Hulme Park and All Saints Park. Being a city centre site there are numerous leisure sites within close proximity to the Site, including HOME cinema, Odeon Cinema, Junkyard Crazy Golf. As well as this, it is a close walk into the rest of the city centre, the Deansgate tram station is within a 5-minute walk from the Site and Manchester Oxford Road railway station is within a 13-minute walk from the Site, providing easy access to the wider city.

Potentially Significant Effects

Table 51 Summary of Potentially Significant Effects

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Individuals seeking construction employment and the local economy (through GVA)	Temporary employment uplift during the construction stage which will support uplift in GVA.	Alongside committed developments, the potential to deliver a significant uplift in construction GVA to the Greater Manchester economy, within a high productivity sector. Effect relevant to all 13 scenarios.	C	In
Individuals seeking employment and the local economy (through GVA)	Net change in direct operational employment (and change in GVA)	Alongside committed developments, the potential to deliver significant uplift in employment (and related GVA) in the local economy (Plot D office space), aligning with surrounding uses and supporting continued growth of the city centre. It is expected that both Phase 3 and Plot D developments will also generate direct operational employment through ground floor retail and restaurant uses as well as through operational maintenance of the residential buildings. Effect relevant to all 13 scenarios.	O	In
Local economy (through GVA)	Uplift in 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.	Potential for significant uplifts in spend attributable to increase in population as well as the potential for office worker spend uplift in the local area. Effect relevant to all 13 scenarios.	O	In
Primary healthcare facilities	Additional demand for healthcare facilities (GP services and dentists) as a result of the uplift in population.	Potential for significant adverse impacts, particularly alongside additional demand from committed developments. Effect relevant to all 13 scenarios.	O	In
Open space and recreational facilities and their users	Additional demand for the use of the existing leisure facilities and open/amenity space within close proximity to the Site.	Potential for beneficial impacts, given the proposed development of 1803m ² of public realm space associated with Plot D and 2,100m ² of public realm space associated with Plot E. Effect relevant to all 13 scenarios.	O	In

Receptor	Effect	Discussion of Effect	Applicable Development Phase (C / O)	Scoped In / Out
Crime	Reduction in crime and fear of crime	The proposed uses have the potential to lead to reduction in crime and fear of crime through 'Secured by Design' compliance which promotes and incorporates good design quality, layout and lighting. Whilst beneficial, these are unlikely to be significant in EIA terms, therefore recommended to be scoped out.	O	Out
Education facilities	Additional demand for primary and secondary school places	The proposed uses will not likely generate a significant level of residents of school age, as described at 1.33, therefore should be scoped out.	O	Out

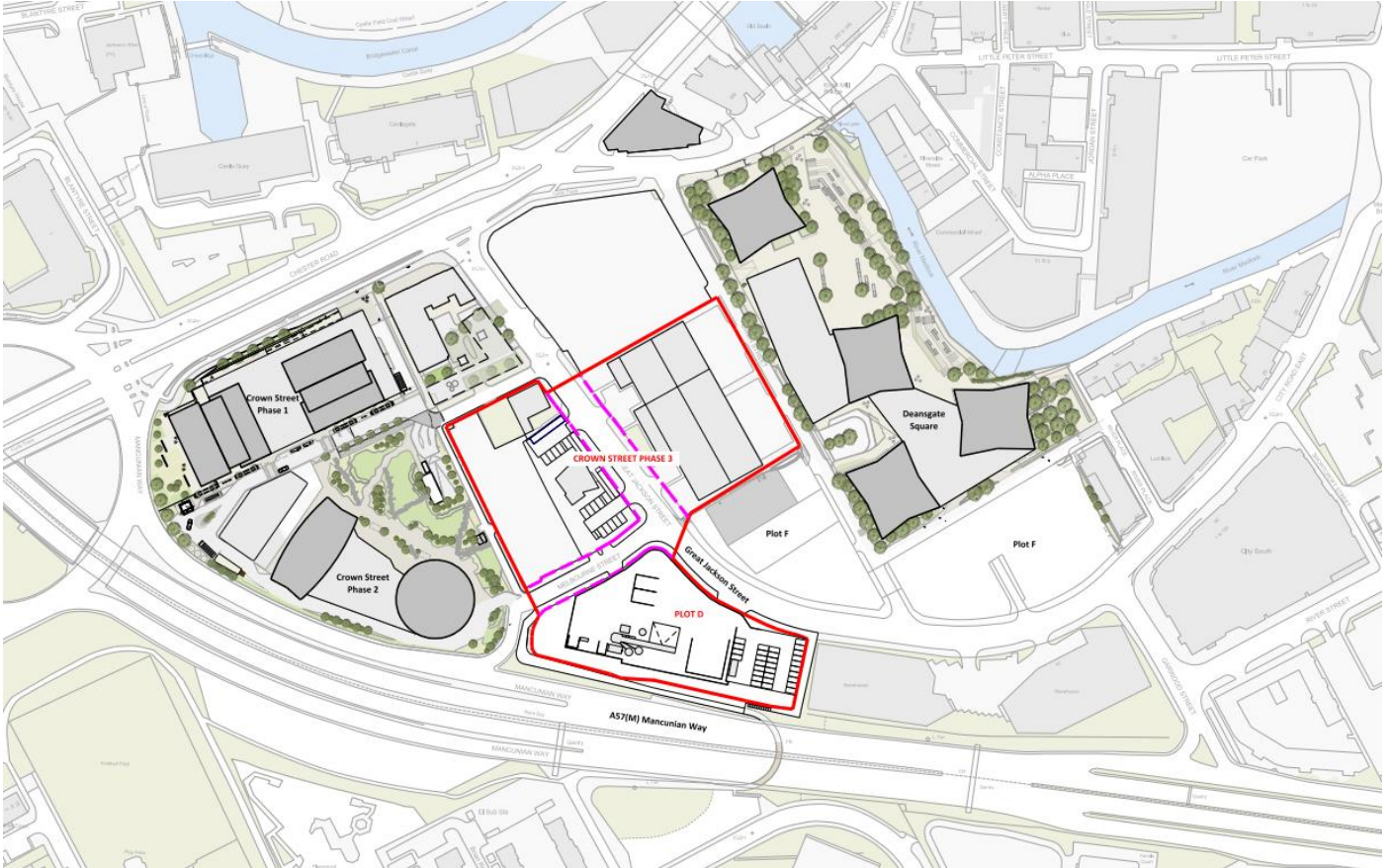
5.445. For completeness, the following Developments are considered relevant and included in the assessment:

Table 52 Summary of 32 Considered Developments

Application Reference	Map No	Distance from Site	Scoped In/Out
Baseline			
Deansgate Square 111719/FO/2016/C1	1	85m	In
Crown Street Phase 2 (incl. School) 126668/FO/2020	2	100m	In
Viadux 126868/JO/2020	3	476m	In
Plot 9 First Street 132600/FO/2021	4	430m	In
10-12 Whitworth Street 111003/FO/2016/C1	5	360m	In
Trinity Islands 132429/FO/2021	6	696m	In
Arundel Street / St George's Place 123261/FO/2019	7	425m	In
Cumulative			
Plot H, Great Jackson Street Framework 129406/FO/2021	8	132m	In
1 Alpha Place 120113/FO/2018	9	449m	In
325 Deansgate	10	326m	In

Application Reference	Map No	Distance from Site	Scoped In/Out
125804/FO/2019			
Hotspur Press 120635/FO/2018	11	540m	In
Plot 11 First Street 125573/FO/2019	12	436m	In
One City Road 128002/FO/2020	13	302m	In
Plot G, 34 Great Jackson Street 129273/FO/2021	14	130m	In
2-4 Whitworth Street 126308/FO/2020	15	336m	In
Bridgewater House Great Jackson Street 134694/FO/2022	16	95m	In
Plot F Great Jackson Street 132199/FO/2021	17	114m	In
One Medlock Street 135419/FO/2022	18	220m	In
Plot 10 First Street 136043/FO/2023	19	390m	In

Appendix 1 – EIA Site Location Plan



Appendix 2 – List of Committed Developments

ID	Name	LPA Planning Ref.	Description of Development	Distance from Site	Status
Baseline					
1	Deansgate Square	111719/FO/2016/C1	Construction of four residential buildings, ancillary amenity building for residents accommodating a tennis court, swimming pool and gym facilities (Use Class C3), ground floor retail units (Use Classes A1, A2, or A3), amenity space for residents within residential buildings, new public realm and landscaping, basement car parking and related highway, access, servicing, engineering and associated works.	85 m	BASELINE Complete, although not all approved landscaping has been delivered.
2	Crown Street Phase 2 (including school)	126668/FO/2020	Full planning permission for the erection of two 52-storey residential buildings (Use Class C3) each incorporating a podium accommodating residential amenity facilities and ground floor and first floor commercial units (Use Classes A1, A2, A3, or D1), private and public basement car parking, landscaping and a public park, servicing and access arrangements, highways improvements, and associated works (Phases A, B, and D as defined on Drawing Reference: 10292Z1SHPG000PL00 B5D802 and 10292Z1SHPG000PLB1B5D801). Outline planning permission (with all matters reserved) for an educational facility (Use Class D1) (Phase C as defined on Drawing References: 10292Z1SHPG000PL00B5D802 and 10292Z1SHPG000PLB1B5D801)	100 m	BASELINE Under construction.

ID	Name	LPA Planning Ref.	Description of Development	Distance from Site	Status
3	Viadux	126868/JO/2020	Erection of a 40-storey building to form 375 residential apartments (Use Class C3a) and the erection of a 14-storey building for form offices (Use Class B1) (31,756 sqm) together with ground floor commercial space (Use Class A1, A3 or A4) (1010 sqm) with associated enclosed service yard, public realm including staircase and lift to connect with viaduct, car and le parking, landscaping and other associated works.	476 m	BASELINE Above ground works have commenced albeit construction has not progressed beyond the podium level.
4	Plot 9 First Street	132600/FO/2021	Erection of a nine-storey building with rooftop plant and basement comprising office accommodation (Use Class E(c)) with ancillary facilities for occupiers including roof top terrace, winter gardens, gym/yoga studio, basement car parking (26 spaces) and cycle parking (130 spaces) landscaping and other associated works.	430 m	BASELINE Above ground works have commenced, with construction expected to commence within the next couple of weeks.
5	10-12 Whitworth Street	111003/FO/2016/C1	Demolition of existing building at 10 - 12 Whitworth Street West, and redevelopment of the site for a new 35 storey residential building (Use Class C3) comprising 327 apartments, with associated residents' services, facilities and communal spaces: servicing, highways, public realm and associated works.	360 m	BASELINE Planning Permission implemented, not under construction. EIA Site has been cleared.
6	Trinity Islands	132429/FO/2021	Erection of four towers ranging from 39, 48, 55 and 60 storeys to form a mixed-use development comprising 1950 residential apartments (Use Class C3a) and commercial uses (Use Classes E and Sui Generis: Drinking Establishment) (361 sqm) within the podium level together with public realm, car and cycle parking, access arrangements and highway works, and other associated works.	696 m	BASELINE Approved – 13th May 2022. Works started on EIA Site.
7	Arundel Street	123261/FO/2019	Erection of a part 8 and 9 storey building located on Arundel Street and Worsley Street, a part 11 and 23-storey residential building located on the Mancunian Way and refurbishment and conversion of the existing DOT Building to form 355 residential apartments in total (Use Class C3a) together with commercial uses (Use Classes A1, A2, B1, D1 and D2) along with associated car parking, cycle parking, access, landscaping and other associated work.	425m	BASLEINE Enabling works underway. Start date TBC.

ID	Name	LPA Planning Ref.	Description of Development	Distance from Site	Status
Cumulative					
8	Plot H, Great Jackson Street Framework	129406/FO/2021	Full planning permission for a 28-storey purpose-built student accommodation building (Sui Generis).	132 m	CUMULATIVE Planning Permission approved 17/05/2022, not under construction and no conditions discharged.
9	1 Alpha Place	120113/FO/2018	Erection of a seven storey apart-hotel (use class C1), comprising 59 rooms on the upper floors, with reception area and ancillary residents' lounge and breakfast area on the ground floor.	449 m	CUMULATIVE Planning permission not implemented, not under construction. Discharge of Condition application submitted in August 2021 shows as pending neither approved nor dismissed on Council website.
10	325 Deansgate	125804/FO/2019	Demolition of existing buildings and structures on-site and erection of 22-storey building comprising apart-hotel (Use Class C1) with flexible commercial uses at ground floor and within existing viaduct arches (Use Class A1, A2, A3, A4, D2), access, landscaping and other associated works.	326 m	CUMULATIVE Planning permission not implemented, not on EIA Site.
11	Hotspur Press	120635/FO/2018	Part demolition and redevelopment and part retention and refurbishment of the former Hotspur Press Complex (Medlock Mill) to deliver 171 residential units (10 no. 1 bed, 1 person apartments, 49 no. 1 bed, 2 person apartments, 2no. 2 bed, 3 person apartments and 110 no. 2 bed 4 person apartments) - Use Class C3, within refurbished mill space and 28 storey building (including two levels of basement), commercial floorspace (Use Classes A1 (shop), A2 (financial and professional services), A3 (restaurants and cafes), B1 (office), D1 (medical clinic, health centre, art gallery and museum only) and / or D2 (gymnasium or bowling alley only) together with servicing, access, landscaping including a new public space and pedestrian route between Gloucester Street and First Street, and other associated works.	540 m	CUMULATIVE Located just outside of buffer zone. Planning permission not implemented, not on EIA Site.

ID	Name	LPA Planning Ref.	Description of Development	Distance from Site	Status
12	Plot 11 First Street ⁶⁶	125573/FO/2019	Construction of four buildings of heights varying from 10 storeys to 45 storeys together comprising Co-living bedspaces (use class sui generis) and associated amenity facilities, with ground floor commercial units (Use classes A3 (Café / Restaurant and D2 (Gym)), private amenity space and public realm comprising hard and soft landscaping, car parking and cycle facilities and other associated works.	436 m	CUMULATIVE Planning permission not implemented, not on EIA Site.
13	One City Road	128002/FO/2020	Full Planning Application for demolition of existing structures on site, erection of one 11-storey plus basement office building (Use Class E) and one 14-storey plus basement office building with ground floor commercial unit (Use Class E), landscaping, highways works, and associated works.	302 m	CUMULATIVE Planning Permission not implemented, not under construction
14	Plot G, 34 Great Jackson Street	129273/FO/2021	Demolition of existing structures and the construction of two residential buildings of 56 storeys (plus basement and roof plant) (use class C3), with ground floor commercial uses (use class E), car parking, cycle provision, landscaping, access and other associated works.	130 m	CUMULATIVE Live planning application in SRF area, which may be approved prior to submission of Proposed Development, not under construction
15	2-4 Whitworth Street	126308/FO/2020	The demolition of 2 to 4 Whitworth Street West and the construction of a mixed-use building, comprising flexible units for retail, food and drink use at ground floor level with a hotel at upper storeys, together with associated landscaping, servicing, cycle parking and other associated works.	336 m	CUMULATIVE Planning Permission not implemented, not under construction
16	Bridgewater House Great Jackson Street	134694/FO/2022	Restoration and conversion of the Grade II listed Bridgewater House and redevelopment of car park area to create a ground plus three storey apartment building; overall providing 53 residential units, including landscaping to courtyard, bike storage and associated works.	95 m	Application in SRF Area. Pending decision (validated on 24th August 2022)

⁶⁶ The committed developments were agreed with Manchester City Council in November 2022 and consultants have based their EIA assessments on this basis. Since then, we have been made aware that Plot 11, First Street has started on-site, all consultants will therefore consider whether Plot 11 First Street being in the baseline will have any impact on their conclusions.

ID	Name	LPA Planning Ref.	Description of Development	Distance from Site	Status
17	Plot F Great Jackson Street	132199/FO/2021	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.	114 m	CUMULATIVE Approved – 1st July 2022
18	One Medlock Street	13419/FO/2022	Demolition of the existing hotel building and structures and redevelopment of the site to comprise two separate buildings: one 13 storey office building with commercial unit (Use Class E) at ground floor; a part 11, part 38 storey building comprising 1,014 purpose built student accommodation units (sui generis) with ground floor office/community uses (Use Class E, F1 or F2); and associated ancillary internal and external amenity space, hard and soft landscaping and associated highway works.	220m	CUMULATIVE Validated Validated - 29th November 2022
19	Plot 10 First Street ⁶⁷	N/A – not yet submitted	TBC – below is a summary we have extracted from the consultation website: <i>“Our proposals for commercially-led, mixed use development on Plot 10 include a next generation sustainable office building and high-quality, purpose-built student accommodation. A ground floor food hall, open to both residents and the public, will add to the vibrancy of the area.”</i> More information is available here: FIRST STREET (firststreet-plot10.co.uk)	390m	CUMULATIVE We understand this is due for submission pre-Christmas. Deloitte to update team as soon as further information available.

⁶⁷ Since agreement with Manchester City Council in November 2022, this planning application has now been submitted and validated



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